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ELECTRICAL WORLD

JANUARY 30, 1932
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A suggestion to producers of electric power—how to increase the ratio of profit in 1932

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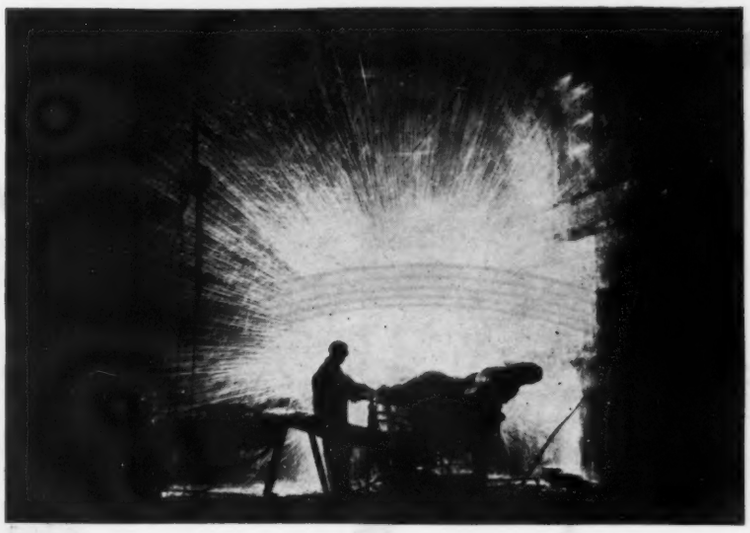

Resistance welding 14-in. steel pipes Babcock & Wilcox Co.

JANUARY 30, 1932

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McGRAW-HILL PUBLISHING COMPANY, INC., 330 WEST 42d STREET, NEW YORK, N. Y.
CHICAGO, 520 N. Michigan Ave. 883 Mission St., SAN FRANCISCO Aldwych House, Aldwych, LONDON, W.C. 2

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Published weekly. $5 per year. 25 cents per copy. Foreign, $9 U. S. currency, or 45 shillings, per year. Canada subscription price (including Canadian duty), $7.50. Entered as second-class matter, January 20, 1907, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Printed in U. S. A.

CABLE ADDRESS: "MCGRAWHILL, N.Y."

Member A.B.P. *Member A.B.C.*

NUMBER OF COPIES PRINTED THIS ISSUE, 16,740

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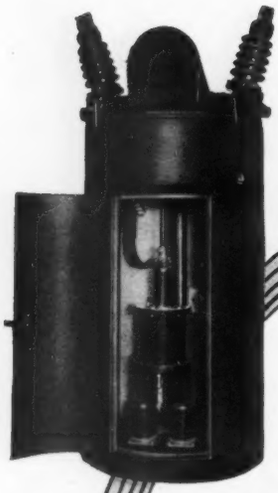

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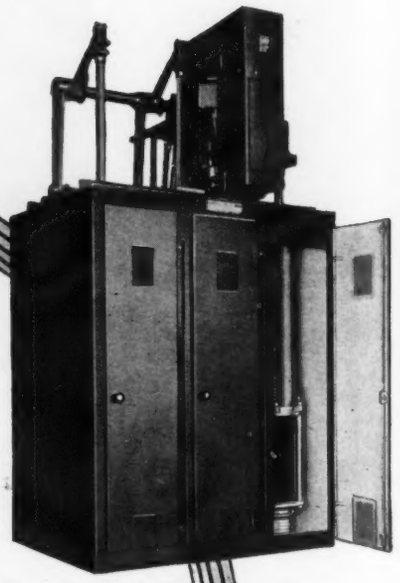

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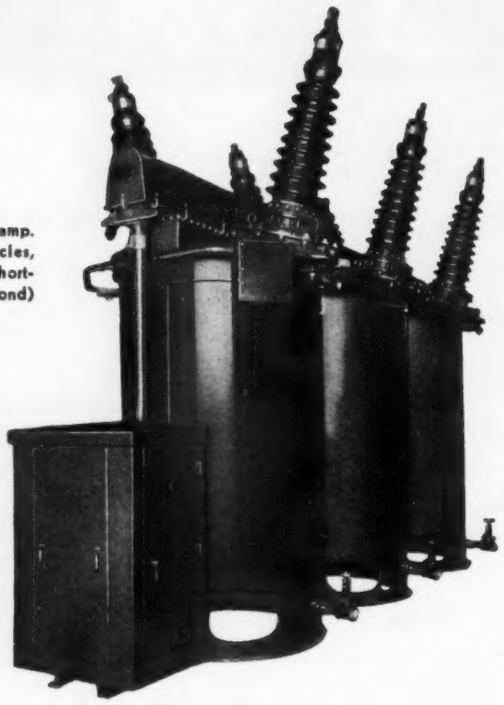

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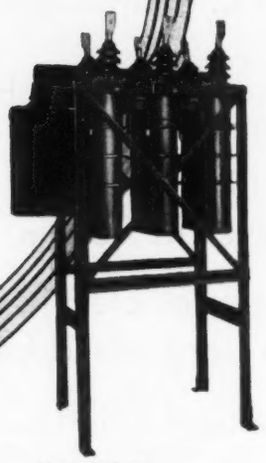

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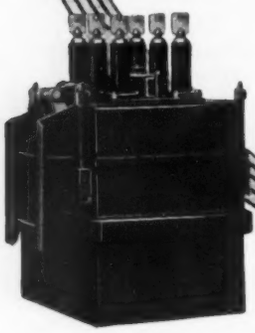

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A BLAST OF OIL—THE ARC IS OUT

ELECTRICAL WORLD

Established 1883. McGraw-Hill Publishing Company, Inc.

for the Week Ending

January 30, 1932

• Guard against unsound governmental engineering projects • Support uniform licensing laws • Development of the machine age cannot be stopped by declaring a holiday on research and invention • Our relatively high living standards should be maintained and extended • Engineers as a group have done more for their fellow members in this depression than any other group or profession •

CHARLES E. SKINNER

[President Skinner so advised the A.I.E.E. at its winter convention this week.]

A.I.E.E. holds winter convention

—**Electrical industry engineers** meet in New York for discussion of recent technical advances in their art and honor Sprague, Pupin and Rice for pioneering work done when the industry was young—*p. 206.*

—**Indoor cubicles standardized** by West Penn Power for a.-c. distribution service. Advantages include safety, freedom from operating errors, economies, flexibility toward service and equipment and neat appearance—*p. 227*

A half-cent tax on all energy?

—**Federal tax on energy urged** by Representative Crisp of the ways and means committee as one of several proposed revenue aids for the government. A corporate or consumer levy possible—*pp. 208 and 218.*

—**Plans for oil-field service must** include development forecasts and special co-operation between supplier and supplied if satisfactory results are to be achieved. A story of work in the east Texas field—*p. 222.*

Columbia development talk revived

—**Mead backs Columbia River** plan. Commissioner of Bureau of Reclamation advocates government project for flood control and power generation on a $394,000,000 scale. A 2,100,000-hp. development?—*p. 209.*

—**Make lighting suit the user** is the earnest injunction of a West Coast engineer who would match psychology with activity and introduce the temperament of the individual into an already complicated problem—*p. 242.*

—**Fallacy of the tax-free town** demonstrated by consultant for utilities division of Florida League of Municipalities. W. Austin Smith finds accounting records incomplete and rates high—*p. 239.*

—**Electric brass-melting furnace** saved its first cost in two years for Massachusetts manufacturer. Scheduled production that assured continuous use was an important factor—*p. 234.*

Sloan Leaves New York Edison

p. 207.

Electrical Engineers Meet in New York for Annual Winter Convention

Reports show engineering developments continue despite depression.
Circuit-breaker performance improves.
President Skinner appeals to the engineer to do his duty as a citizen.
Honors awarded Pupin, Rice and Sprague.

NEITHER the ingenuity, the resourcefulness nor the desire for accomplishment which characterize the electrical engineer have been appreciably affected by hard times. This was made manifest at the winter convention of the American Institute of Electrical Engineers, held in New York this week, when many notable and inspiring technical accomplishments were reported. Gaps have been filled in theory, and a modest amount of new equipment has been placed in production. Development work has not lagged and equipment performance has notably advanced. Morale is good, and the delegates were told by President C. E. Skinner that "engineers as a group have probably done more for their fellow members than any other group or profession."

Notable among the technical developments reported were a new high-speed distance relay which offers better protection than was formerly available, graphic instruments employing photoelectric elements which now approach the status of indicating instruments of the highest sensitivity, improved shielding and advances in the technique of bridge manipulation which now permit power-factor measurements as low as 0.00007, a cone-type air condenser capable of adjustment to 0.0001 micromicrofarad, a fully automatic oscillograph which starts recording in less than half a cycle, an induction motor with a paralleled rotor and stator said to offer improved characteristics, further refinements in the design of surge-proof transformers, allocation to the amount of current flowing between electrodes in smoke-precipitation elements of the main burden for nearest approximations of complete clarification, mercury-arc rectifiers of the sectional type with higher capacities and efficiencies, a new form of carrier-current under-sea telephone communication cable, and notable improvements toward increased stability of operation and uniformity of results in electric arc-welding equipment.

Breaker theories hotly discussed

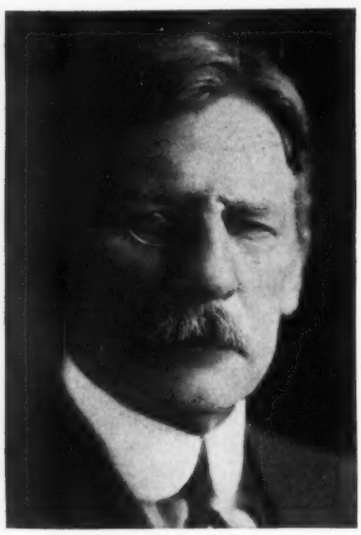
As has been the case for several years, much interest and considerable discussion over the pros and cons of the oil-blast theory of circuit interruption and over the de-ion theory of the same phenomena was evidenced at the session devoted to protective devices. Whatever may be the merits of the respective sides, the fact remains that, call the principle by any name one will, the records show oil circuit breakers to have been improved in speed, capacity and reliability far beyond the most hopeful expectations of experts five years ago.

While still far from vanquished, that arch enemy of the overhead lines engineer, lightning, has yielded appreciably to coercive persuasion. Causes of outages are better known, and better lightning arresters and improved technique in their use are in evidence. A notable conclusion was reached in the paper of Harding and Sprague to the effect that "the potential at the transformer may be reduced by the interconnection of the primary lightning arrester ground with the grounded neutral of the secondary main."

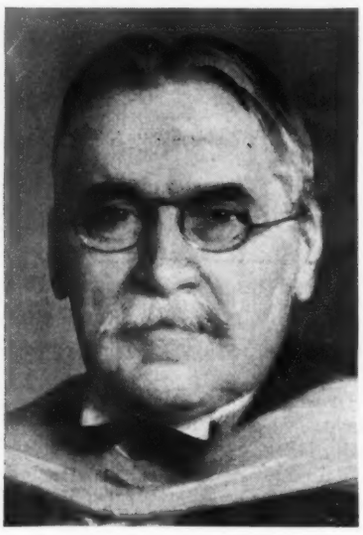
It was found by D. W. Roper in studies of distribution transformer performance that over a period of years small-size transformers proved more susceptible to lightning damage than those of larger capacities, and the smaller sizes have therefore been eliminated wherever possible. It appears possible, Mr. Roper said, to design and construct at reasonable cost distribution transformers that will be practically immune to lightning troubles when protected by the modern type of arresters.

▼

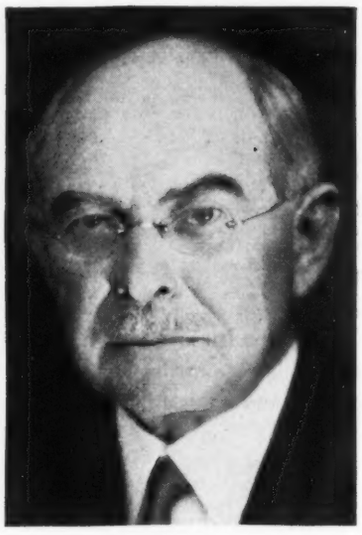
HONORED AT A.I.E.E. WINTER CONVENTION



Frank J. Sprague



Michael I. Pupin



Edwin W. Rice, Jr.

The American Institute of Electrical Engineers awarded high honors to three engineers at the winter convention in New York this week. Frank J. Sprague, traction and elevator pioneer, was made an honorary member. Edwin W. Rice, Jr., for his contributions to the development of electrical systems and apparatus and for his encouragement of scientific research, was awarded the Edison medal. Michael I. Pupin, electrophysicist and communication engineer received the John Fritz medal.

In opening the convention President Skinner urged that the engineer perform his duty as an informed citizen when governmental projects of doubtful value are proposed. Mr. Skinner also urged the support of engineers for uniform licensing laws and for the effective co-ordination and correlation of the public works functions of government. Other pleas were for an A.I.E.E. sponsored history of electrical development and for defense of the machine age.

A more complete report of the convention will appear in next week's issue of the ELECTRICAL WORLD.

▼

New York Senators Confirm Entire Power Authority

Confirmation by the New York State Senate of the appointments made by Governor Roosevelt last summer to the Power Authority of the State of New York was given on January 26. Those confirmed in their offices are Frank P. Walsh, chairman, New York City; James C. Bonbright, New York City; Fred J. Freestone, Interlaken; Morris L. Cooke, Philadelphia, Pa., and Delos M. Cosgrove, Watertown.

Commissioners Bonbright, Freestone and Cosgrove were confirmed unanimously. There was a divided vote on Mr. Cooke and Chairman Walsh. Mr. Cooke's appointment was criticised because he is a citizen of Pennsylvania. The confirmation of the chairman was attacked by Senator George R. Fearon, Republican of Syracuse, majority leader of the Senate, who declared that Mr. Walsh had shown himself to be unfit for the office. The chairman was vigorously defended, and two up-state Republican Senators and Senator Hofstadter of New York voted with the Democrats for confirmation. Absentee Democrats being counted by consent, this gave a vote of 27 to 22 for confirmation of Mr. Walsh. Mr. Cooke was indorsed by 28 to 17, a number of Senators not voting.

▼

Rates at National Capital Go Down Several Points

Despite the litigation over rates now proceeding in the District of Columbia courts (ELECTRICAL WORLD, January 23, page 163), the Public Utilities Commission of the District has announced its acceptance of an offer by the Potomac Electric Power Company to reduce its electric rates by an amount aggregating $860,000, effective February 1.

The commission wished to allocate the total decrease so as to make a residential rate of 3.6 cents, but the company resisted and the following compromise was reached: For the first 50 kw.-hr. a month, 3.9 cents per kilowatt-hour; for the next 50 kw.-hr., 3.8 cents; for all over that, 3 cents. For separately metered domestic energy for other purposes than lighting 3.9 cents will be the rate for the first 10 kw.-hr. and 2 cents for all over that. The new rate will be almost undoubtedly the lowest in any of the big cities of the nation, central-station or municipal. Commercial schedules were to be framed at later hearings.

Under the consent decree, by which rates have been reduced annually since 1925 on the basis of sharing the excess earnings of the company, the decrease for this year would have been about $600,000, according to the commission. This decree, as previously reported, has been abrogated by the commission, which ordered a new sliding scale for division of excess profits, and the action was appealed to the District Supreme Court. Under the division ordered by the commission the reduction for 1932 would have aggregated about $1,000,000. The court battle will continue. The compromise is effective only until the appeal from the commission's sliding-scale order is finally settled.

▼

Matthew S. Sloan Resigns from N. Y. Edison Group

Matthew S. Sloan has resigned as president of the New York Edison Company and its affiliated electric companies, as trustee of the Consolidated Gas Company and as director of companies in the Consolidated Gas group, effective immediately. The resignation was acted on at a meeting of the board of trustees of the Consolidated Gas Company on January 28. "I have business plans for the future which I am not at liberty to discuss now," said Mr. Sloan in announcing his resignation.

This news was announced as the ELECTRICAL WORLD closed its forms. It is with regret that the industry will learn of the resignation of Mr. Sloan. His contributions have been many, he has filled many positions, and his vigorous and honest actions have benefited both the New York properties and utilities in general.

An engineer by early training and education, Mr. Sloan has devoted practically the whole of his business life to the public utility industry. He entered the Alabama Polytechnic Institute at the early age of fourteen and he received his degree before he had reached his twentieth year. His first work was in a public service plant in a small town in Alabama—his native state. After a short connection with the Memphis Street Railway Company he joined the General Electric Company at Schenectady.

Trade Sentiment Better; Volume Still Unchanged

The close of January shows an unmistakable improvement in business sentiment since the end of the year. It is not based on any definite rise in trade or in production, except for seasonal advances in isolated industries, but on intangible factors.

Reduction of the United States Steel dividend to a 50-cent quarterly basis was disappointing, but not so much so as earnings for the last quarter, which were smaller than for any three-month period in the company's history. The seasonal increase in the steel industry since January 1, however, is regarded as satisfactory.

Wholesale prices of several commodities still recede, although in the first half of January copper, cotton and other products turned upward.

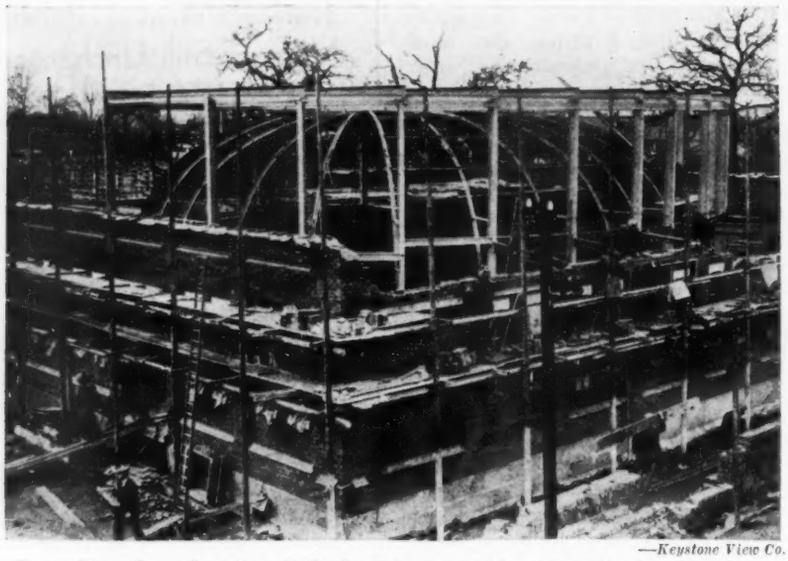
Some improvement is noted in the banking situation and there are evidences of increasing investment demand for securities.

Car loadings turned up slightly this week and some improvement is noted in employment.

It was in 1906 that he severed his connection with the General Electric organization to enter the public utility field as chief engineer of the Birmingham Railway, Light & Power Company. He held successively the positions of assistant superintendent of power, superintendent of the electric department and assistant to the president, with supervision over all departments and full executive powers. In 1914 he became operating manager of the New Orleans Railway & Light Company and three years later vice-president and general manager, holding that office until he went East in 1917 to join the New York Edison Company as assistant to John W. Lieb, vice-president. In the summer of 1919, upon the resignation of Nicholas F. Brady, he became president of the Brooklyn Edison Company, and in 1928, when that company came into the new Consolidated Gas set-up, he was made president also of the New York Edison Company, the United Electric Light & Power Company, the New York & Queens Electric Light & Power Company and the Yonkers Electric Light & Power Company.

One of Mr. Sloan's greatest interests in the utility field has been that of public relations. He was a few years ago chairman of the public relations committee of the National Electric Light Association, of which he is also a past-president, and at the present time he is serving on the public policy committee and with the electric refrigeration bureau. He is also a past-president of the Association of Edison Illuminating Companies and of the Empire State Gas & Electric Association.

ENGLAND CONTINUES RAILWAY ELECTRIFICATION



—*Keystone View Co.*

In spite of national political and economic turmoil the Southern Railway is going ahead with its London-to-Brighton 60-mile main-line section. One-hour service will permit business men to work in London and live by the sea. The illustration shows a control room under construction at Three Bridges, Sussex.

▼

Emergency Rates Benefit Customers in Indiana

A state precedent in utility regulation has been set by the Indiana Public Service Commission in the shape of a blanket reduction without any audit or appraisal. This action is expected to have a widespread bearing on future rate cases. Its specific result is to reduce electric rates at Marion, Ind., a flat 20 per cent for all services.

Commissioner Howell Ellis said that 50 per cent of the property of the Indiana General Service Company, which serves Marion, was built in the high-price era and thus is reflected at high figures on company books, but that under a new valuation these values would be lowered greatly. He said there had been a "startling decline" in cost of labor and materials since the Marion plant was constructed.

An emergency section of the utility law is invoked to give legal justification to the reduction during the period while an appraisal is being made. Mr. Ellis asserts that in the past this section has been invoked solely for the benefit of utilities. In this case it is invoked for the benefit of customers and the reduced rates will remain in effect until a final order based on valuation is made.

Electric rate reductions totaling about $427,765 annually were also ordered last week by the commission for 76 communities in the southern part of the state served by the Public Service Company of Indiana. The commission ordered emergency rates established by the utility, to remain effective until a hearing is held to determine whether they shall be made permanent. The order established uniform rates for all communities throughout the district. All classes of consumers are affected, but the biggest reduction goes to residential users. A minimum charge of $1 a month was fixed. Though the rates decreed by the commission are lower than those previously offered by the company, the system basis adopted is virtually the same asked for several times by the Insull utilities in southern Indiana only to meet refusal.

Legislation regulating utility rates in Indiana will be urged at the next convention of municipal officials by city officials of Bloomington. It is possible the recommendations will be adopted, for during the past six months there has been a concerted effort on the part of many cities to force lower rates in all utilities. It is the contention that the procedure of the Indiana commission under present laws is too slow to offer relief when it most is needed. The situation is complicated by mergers.

▼

Oregon Grange Pushes Hydro

The Oregon State Grange has filed with the Secretary of State the preliminary information for a ballot title of an initiative petition providing for a constitutional amendment authorizing the state to engage still further in the business of developing and operating hydro-electric power projects. The Grange to this end lists nine functions which it wants vested in the state and included in the title to initiative petitions which the Grange will circulate.

▼

Burdensome Tax on Electricity Proposed

Ways and means committee of House hears suggestion of half-cent tax per kilowatt-hour.

Speedy change to sales tax somewhere between 1 and 10 per cent.

HEAVY taxes on electricity are among a number of new forms of taxation now under the consideration of the ways and means committee of the House of Representatives, which has the duty of preparing a tax measure adequate to balance the nation's budget. This suggestion has been made by Representative Crisp of Georgia, who ranks next to the chairman on the Democratic side of the committee. It was originally proposed by Mr. Crisp that a tax of one-half cent a kilowatt-hour be assessed and that this should be a tax on consumption. Later, following the rumblings of a coming storm of protest, the proposal was changed to one calling for a general sales tax of from 1 to 10 per cent applied to electric, gas and telephone bills. The committee has set aside Tuesday, February 2, as a date to allow those opposed to such taxes to present their testimony, and the electrical industry is certain to be well represented, as will be its customers.

At a recent hearing of the committee it was brought out that, estimated on the 1930 gross income of electric power, natural gas, manufactured gas and telephone companies, a tax of 1 per cent on these services would produce $41,000,000. The small household user paying $3 a month for electricity would pay only 3 cents additional. Representative Crisp has indicated that if such a tax is decided upon, it should apply to energy supplied by municipally owned plants as well as to privately owned electric companies.

Mr. Crisp estimates that a 5 per cent sales tax on electricity, to which he now seems to lean, would raise approximately $100,000,000. The annual revenue from the half-cent kilowatt-hour tax first put fourth as a tentative plan was estimated at $350,000,000. It is probable that all the implications of this tremendous impost had not been grasped by those who suggested it and that they failed to realize the blow it would deal to industries consuming vast amounts of power or that some single firms purchase annually kilowatt-hours requiring nine figures for expression.

New Mississippi Governor for Utility Regulation

Recommendations for utility regulation were made last week by Governor Martin S. Conner of Mississippi, successor to Governor Bilbo, who had made the companies an object of attack (ELECTRICAL WORLD, January 16, page 122). In his inaugural address Governor Conner said:

This control should protect the public against unfair rates and charges and guarantee adequate and efficient service, to the end that public utility operations may be useful but not oppressive. It should encourage and safeguard every honest interest and every laudable undertaking of the public utilities so that investors may have confidence in our laws, our officials and our people, and so that our state's general welfare may be promoted.

We have a commission charged with the duty of regulating certain public service corporations, but no adequate provision has been made for the regulation of other public utilities, particularly power and gas distributors. I urge you to enact legislation for the proper regulation and control of all public utilities, with equal regard for their welfare and the public interest, and that you establish a state agency clothed with ample powers and means to enforce such regulatory control.

The State Railroad Commission may be vested with authority over utility companies if the Governor's views prevail.

▼

San Antonio Utility Is Forbidden to Merchandise

An injunction has been issued by the District Court at Austin, Tex., restraining the San Antonio Public Service Company from engaging in the merchandising of electric and gas appliances and also from operating sightseeing or other motor buses not used in connection with its street-railway system. The suit against the company, as previously reported in the ELECTRICAL WORLD, was filed by Attorney-General James V. Allred, who alleged that it was exceeding its charter powers in selling appliances and performing the other act complained of. The state's petition asked for forfeiture of the company's charter and for penalties. The court declined to order this or to do more than to enjoin the company, refusing also to assess a fine against it. An appeal will be taken to the state Court of Civil Appeals by the company.

The decision, if it should be upheld by the higher courts, will affect almost all the utility companies in Texas, and great interest was shown by them in the suit. Millions of dollars of appliances are sold annually in the state by these companies, it was shown by the testimony. The Central Power & Light Company, an Insull subsidiary, sold $778,393 of appliances in Texas in 1930, according to J. R. McCoy, commercial manager of the company. Several of the other utility companies did an equally large or a larger business.

In granting the injunction the court said that the testimony showed that some utilities had sold appliances in Texas for nearly a quarter of a century, but that the case before him involved only the San Antonio Public Service Company. Its engagement in the sale of appliances, Judge Wheeler said, was "neither essential nor necessary."

▼

Mead Backs Federal Development of Columbia River

Fresh interest has been attracted to long-discussed plans for a vast government irrigation and power project on the Columbia River in the State of Washington by a report of the Bureau of Reclamation which was recently made public by Commissioner Elwood Mead. Ultimate investment of $394,155,000, reclamation of 1,200,000 acres of land and generation of 1,100,000 hp. of firm and 1,000,000 hp. of secondary hydroelectric energy are outstanding features of the scheme, for which Dr. Mead predicts success if the proper co-operation can be obtained. He says in explanation of the project:

It is to be a combination of power and irrigation, with improvements of navigation and flood control as incidental features. It will include a dam and power plant estimated to cost $185,890,000, including interest during construction. This is to be repaid from power revenues with 4 per cent interest within 50 years after completion. Irrigation works will reclaim 1,200,000 acres of land at an estimated cost of $208,265,000, or approximately $174 an acre.

The plans contemplate the installation of power machinery for the development of 2,100,000 hp., of which 1,100,000 hp. will be firm power. The million secondary horsepower will be available for pumping water for irrigation. The estimated selling price of firm power is 2.25 mills per kilowatt-hour at the switchboard. Secondary power is to be sold at a price that will result in a pumping charge of $1 per acre.

The costs of irrigation works will include no part of the cost of the dam and power plant, but will include all works connected with the pumping and distribution of water. . . . Irrigation development is to be deferred until the completion of the dam and power plant and to proceed thereafter by units as justified by the demand for additional land by settlers.

The feasibility of the project depends, therefore, upon the demand for power and the ability of the power market to absorb the power within a reasonable period after completion of the dam and on the negotiation of contracts for this power before construction begins. Much will depend on the attitude of the states and municipalities toward the enterprise.

Coming Meetings

National Electric Light Association—Group committee meetings: Engineering National Section, New York, Feb. 1-5; Accounting National Section, Statler Hotel, **St. Louis, Feb.** 15-17; Commercial National Section, Edgewater Beach Hotel, Chicago, March 22-24. A. J. Marshall, 420 Lexington Ave., New York.

Process Heating Conference — Case School of Applied Science, Cleveland, Feb. 10-12. W. R. Veazey, Case School, Cleveland.

Great Lakes Division, N.E.L.A.—Sales conference and Commercial Section, Edgewater Beach Hotel, Chicago, Feb. 18-19; Engineering Section, Sherman Hotel, Chicago, April 13 and 14. R. J. Malcomson, 72 W. Adams St., Chicago.

National Association of Purchasing Agents—Public Utility Group, Birmingham, Ala., Feb. 18-20. G. A. Renard, 11 Park Place, New York.

North Central Electric Association—Engineering Section, St. Paul Hotel, St. Paul, Feb. 22 and 23. J. W. Lapham, 803 Plymouth Bldg., Minneapolis.

Oklahoma Utilities Association—Tulsa, Okla., March 8 and 9. E. F. McKay, 1020 Petroleum Bldg., Oklahoma City.

American Institute of Electrical Engineers—District meeting, Milwaukee, March 14-16. F. L. Hutchinson, 33 West 39th St., New York.

Maryland Utilities Association — Lord Baltimore Hotel, Baltimore, April 8. D. E. Kinnear, 803 Court Square Bldg., Baltimore.

New England Division, N.E.L.A.—Safety conference, Boston, April 8. Miss O. A. Bursiel, 20 Providence St., Boston.

Arizona Utilities Association—Tucson, Ariz., April 13-15. J. S. Arnold, Central Arizona Light & Power Co., Phoenix, Ariz.

Southeastern Division, N.E.L.A.—Old Point Comfort, Va., April 20-22. C. M. Kilian, 508 Haas-Howell Bldg., Atlanta.

Southwestern Division, N.E.L.A. — Arlington Hotel, Hot Springs, Ark., April 25-28. S. J. Ballinger, San Antonio Public Service Co., San Antonio.

Missouri Association of Public Utilities—Excelsior Springs, Mo., April 28-30. F. D. Beardslee, 315 N. 12th St., St. Louis.

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Authorization of the project is provided in bills now before Congress. Additional information concerning its main features was supplied at the bureau. According to this information, the Columbia River Dam will be about 450 ft. in height above the foundation and create a reservoir about 150 miles long, extending to the international boundary.

The territory expected to provide a market for Columbia River power includes the area within a radius of 300 miles of the dam site, embracing all of Washington, the northern part of Oregon, the northern part of Idaho, and the western part of Montana. The present installed capacity of municipal and utility plants within this territory totals about 1,000,000 kw., of which about 28 per cent is steam-electric power. Virtually all the power of the major hydroelectric developments on which construction has been started by power companies and municipalities will, the bureau thinks, have been absorbed by 1940, which is the earliest date that power from the Columbia River development could be made available.

SAFE HARBOR'S FOUR 42,500-HP. KAPLAN TURBINES

—*Wide World Photos*

In another two years there are to be six of these machines in operation in this latest of the big hydro plants of the nation, and eventually twice as many. ("Electrical Word," December 5, 1931, page 992.)

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Niagara Falls Power Hearings Adjourned

Transactions of Col. William Kelly, general manager and vice-president of the Buffalo, Niagara & Eastern Power Company, in connection with the acquisition of power properties and rights along Eighteen-Mile Creek in the Niagara Falls area were described on the third day of the hearing before the Federal Power Commission last week. He told of his former affiliations with the Federal Power Commission and the N.E.L.A. He had, he said, conducted an investigation of the application of the Hydraulic Race Company in 1920, when he was the commission's engineer, and recommended then that it be denied as uneconomical because the volume of cubic feet of water per second was insufficient. Subsequently the application was revived.

R. J. Le Boeuf, Jr., counsel for the company, called the attention of the commission to an additional $270,000 not included in the original petition for evaluating the investment, which was set at $1,500,000. Mr. Le Boeuf explained that when that valuation was set down in the petition a suit was pending between New York State and the Ontario, Lockport & Niagara Power Company, a property linked with the transfer of power rights, and certain costs could not then be set down. The company was permitted to include the amount.

Counsel for both the company and the New York Public Service Commission requested that their final arguments summarizing the evidence be held in abeyance until certain documentary evidence requested during the hearing be placed before them. The commission concurred.

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Pass New Wisconsin Law Though Old One Is Valid

Despite the fact that on January 12 the Wisconsin Supreme Court held that the original 1931 utility regulation law of that state was constitutional (ELECTRICAL WORLD, January 16, page 119), the Loomis bill to amend it was passed by both houses at the special session and sent to the Governor. In its final form the bill limits the charges that may be made against any investigated utility to one-half of 1 per cent of its gross revenues. The commission may charge utilities for investigation costs whether investigations are made on its own motion or at the request of the utilities.

In its opinion the Supreme Court said:

"It is well settled in this country that the regulation of public utilities is a necessary government function, and no reason is seen why the state may not impose upon them the expense of regulation. Public utilities cannot function as such except as they receive a franchise from the state, and the state, as a condition of granting the franchise, may impose upon them the cost of regulation."

The Wisconsin Telephone Company, which contested the original law, announces that it will carry the case to the United States Supreme Court.

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Rate Cuts in Hartford, New London and Elsewhere

A rate reduction of 1 cent per kilowatt-hour to the Hartford Electric Light Company's 5,000 commercial customers became effective January 1. President Ferguson says that this step was taken because the company's general business apart from industrial patronage had held up better than was anticipated and also because further economies in the production of electricity are expected. The price of energy has become 4 cents per kilowatt-hour for the first 500 kw.-hr. consumed.

Reduced rates for electricity for domestic uses and for commercial uses in stores and offices are announced by the Connecticut Power Company. New London, Middletown, Plymouth, Thomaston, Waterford and Portland are among the places affected. It is estimated that more than 14,000 customers will receive reductions for residential rates. The commercial rate involves 1,400 customers.

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New York Commission Indorses New Rural Plan

A new plan for the extension of electric lines in rural communities which is to be put in effect February 1 by the Orange & Rockland Electric Company has been approved by the New York Public Service Commission. This plan distributes the excess charges resulting from serving scattered customers in proportion to the ease or difficulty of constructing the lines.

The method provides that if a customer or group of customers desires service at a point more than 100 ft. from the existing line, he or they shall contract to pay to the company, in monthly installments, an annual facilities charge. This charge is to be 12 per cent of that portion of the investment made by the company which will remain after deducting the fixed sum of $80 for each customer at any time connected. The basis of this deduction is the company's claim that this is the average investment for all of its customers, city or country, and it is therefore willing to invest up to this amount without any guarantee of return other than the minimum of the schedule. The annual charge when ascertained for any given extension is borne among the applicants according to demand.

City Plant Not Allowed to Prevent Competition

A permanent injunction has followed the temporary one reported in the ELECTRICAL WORLD of December 12 (page 1031) as issued by a Texas court to prevent the city of Seymour from forcing up the minimum rates of the Texas Electric Service Company to a level with those of the municipal plant, which is a Fairbanks-Morse installation made in 1928 at a cost of $125,000 and on which the city has not found it easy to meet the payments. The United States District Court for the Northern District of Texas in granting the permanent injunction said:

The city began its campaign in the present case by promising to the people a lower rate than was then being charged by the serving company. When the new plant was established that rate was put into effect. At once the established company lost approximately half of its customers, and it thereupon lowered its rates beneath those charged by the other concern, and then followed the effort of the City Council, through the ordinance complained of, to require the complainant to increase its rates to those charged by the city plant. So we find that each side has engaged in what may be termed active competition. Neither may be said to have exceeded its lawful rights. It seems that the equities are with the complainant, and that the defendant should be enjoined from putting into effect the ordinance complained of or from visiting any of the criminal penalties of such ordinance upon the complainant.

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Security Issue Privileges Will Be Re-examined

One of the consequences of the inability of corporations to carry on financing operations for a period is the required revision of the figures and conditions on which the privilege was earlier granted. The Public Service Commission of New York State has announced that it will revoke, in many cases, the unexercised authority granted some time ago to various utilities to issue securities. In certain cases a time limit of six months has been set for the financing operations requested. In some instances the commission has directed the reopening of cases for further examination. Most of the securities affected by the decision are mortgage bonds and common and preferred stocks.

Authorized but unissued securities on April 28, 1931, aggregated $146,524,195, plus 30,871 shares of no-par capital stock, as follows: Bonds, $45,969,880; preferred stock, $10,286,705 par value; common stock, $87,084,095 par value; notes, $3,126,114; debentures, $57,400; no-par preferred stock, 11,034 shares, and no-par common stock, 19,837 shares. This, of course, includes securities of all public utilities.

Consents to the cancellation of unissued securities were filed by 32 companies in 37 cases, involving an aggregate par or face amount of $18,586,134 and 6,194 no-par shares of stock. Securities issued between January 1, 1931, and the date of hearings aggregated $71,444,514, par or face amount, as reported by 28 companies in 31 cases.

In addition to canceling unissued securities for which consents were received the commission canceled an additional par or face amount of $2,977,760 and 2,163 shares of no-par stock, embracing nineteen cases. Six cases involving $4,849,300 of determinable unissued securities were reopened.

A time limit to June 30, 1932, within which to issue unissued securities, was established in 29 cases, involving a par or face amount of $18,733,780, and in which a majority of the companies affected have joined. The commission continued 31 cases involving securities aggregating $29,951,700 par or face amount and 22,379 shares of no-par stock, because of exchange, conversion or other provisions or for further examination.

The order of the commission for reexamination will affect 104 companies, it is understood.

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Financing Resumed After Three-Month Lapse

THE three-month hiatus in new financing operations seems to have been broken. Indications referred to last week that the program would shortly be resumed have materialized. One or two substantial issues have been floated and several others are before the commissions.

Reflecting, no doubt, the excessively blue atmosphere of the larger cities, the bankers have leaned backward in accepting new offerings. Utilities in some sections of the country are marketing their preferred stocks successfully. One executive stated recently that his company could secure all its capital requirements through customer sales if necessary. Various factors seem to show that strenuous market cultivation will provide ample outlet for prime utility securities. The 1932 capital program looks less formidable than it did.

A study just completed by the National Industrial Conference Board provides an interesting sidelight on this question. It finds that every family in the United States would have $10,961 of capital and an annual income of $2,366 if the national wealth and income of 1930 could be divided equally between all the families in the country. This is true despite a drop of $32,100,000,000 in national wealth and of $14,000,000,000 in national income from 1929 to 1930. There is still some buying power left in the United States.

Dividend reduction by the directors of the United States Steel Corporation caused a sharp reaction in prices. The market seems now to be in a sort of zero hour and some impetus more substantial than any yet applied seems necessary to induce definite motion in either direction. In any event, the utility average of 50 stocks has changed little over the past three weeks.

Consolidated Gas Company Subsidiaries to Enter Market

Three electric subsidiaries of the Consolidated Gas Company of New York have applied to the New York Public Service Commission for authority to issue $75,000,000 in 5 per cent bonds, or $25,000,000 for each company, of which $50,000,000 is to be sold to the public.

The first issue that was offered publicly consisted of $25,000,000 New York Edison Company first and refunding mortgage 5 per cent twenty-year gold bonds, series C, dated October 1, 1931, and $25,000,000 Brooklyn Edison Company general mortgage 5 per cent 25-year gold bonds will follow. The application included the sale to the New York Edison Company of $25,000,000 United Electric Light & Power Company first mortgage 5 per cent 75-year gold bonds, series B. This financing supersedes the plan of the Consolidated Gas to sell 574,374 shares of $5 dividend preferred stock for an amount not less than $54,565,530, which was applied for in March, 1931, and is additional to the offering of $60,000,000 gold debenture 4½ per cent twenty-year bonds offered by the National City Company at 101 and interest on May 27, 1931, and to common-stock financing by several subsidiaries.

The financing will provide funds to restore to the companies' treasuries expenditures made for new plant, machinery, equipment and other improvements and to eliminate intercompany and other indebtedness incurred in construction work.

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New Jersey Utility Cuts Cost and Shows Rise in Net

Another big utility system has shown that although gross revenues may show a decline net income can be actually increased by rigid reduction of operating costs. The Public Service Corporation of New Jersey had gross earnings of $137,259,454, against $138,161,946, a decrease of almost a million dollars, but operating expenses, maintenance, taxes and depreciation were reduced by $2,889,830, so that net income from operation actually increased by 4.6 per cent.

Other net income amounted to $1,130,880 and income deductions were $15,987,810, leaving a balance for dividends and surplus of $30,540,752, which was an increase of $377,450 over that of the previous year.

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France Sets Quotas for Electrical Imports

Import quotas have been established for the importation into France of certain electrical apparatus and equipment, including vacuum cleaners, motors, transformers, generators, control apparatus and heating apparatus, according to the Department of Commerce.

For the period from January 20 to March 31, 1932, a quota of 377.1 metric tons has been fixed for imports from the United States of electric motors, generators, industrial electric transformers (cooled by air or oil), current rectifiers and electric motors and generators (not combined with ignitions) for all kinds of automotive vehicles, including those for ships, boats, airplanes, etc.

Apparatus for switching, regulating, protecting and distributing electric current, including electric switchboards, mounted or unmounted, for non-automatic apparatus (but transformable into automatic), imported without the automatic parts, the quota is 22.4 metric tons; for automatic apparatus imported complete it is 21.8 metric tons.

For electric heating and cooking apparatus, including electric furnaces, a quota of 17.5 metric tons, and for electric vacuum cleaners, floor polishers and cleaners and shoe polishers a quota of 4.4 metric tons is established.

The quotas are presumably calculated on the basis of average imports into France during a certain period, but the period taken as a basis is not yet known.

Industries Slow in South and West

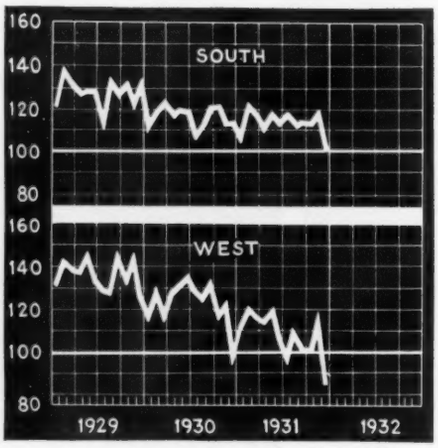
MANUFACTURING activity in the South and West in December decreased somewhat compared with November, as it did also in other parts of the country. ELECTRICAL WORLD index numbers, based on individual reports of electrical energy consumption in numerous manufacturing plants in various industry groups, are given in the accompanying table.

Corresponding index numbers for other geographical regions and for the country as a whole were published in the issue of January 16. The present figures for the South are a continuation of the series in the issue of November 7, which carried the index through July, 1931.

While the apparent rise from October to November may be due in part to more work on election day and Thanksgiving than has been assumed for computing the index, the former being counted as half a day and the latter as a full holiday, this would make only a moderate change in the values and does not eliminate the very considerable drop in December.

In the South every industry except textiles is lower than it was a year ago, and lower also than in November. The decrease is large in the metal-working plants, forest products, paper, rubber and in the stone-clay-glass group. The last named is much affected by curtailment in cement manufacture. Compared with 1930, iron and steel are down nearly 50 per cent. The textile industry, on the contrary, is up 20 per cent and is above the level of last August.

In the West the decline from November is pronounced in chemicals, foods, metal-working and stone-clay-glass, but, at that, the food industry is up 28 per cent from 1930. Throughout, the most significant feature of the table seems to be the low present status of the industries that would reflect activity in new construction.



Indices of Industrial Activity in South and West

Base: Average Month, 1923-1925 = 100

Industrial Groups	South						West			
	December, 1931	November, 1931	October, 1931	September, 1931	August, 1931	December, 1930	December, 1931	November, 1931	October, 1931	December, 1930
All Industry	**100.0**	**119.3**	**113.2**	**113.8**	**112.8**	**113.9**	**852**	**111.0**	**102.2**	**999**
Chemicals	137.0	157.8	144.6	156.6	131.0	132.8	55.2	101.5	88.0	80.7
Food	151.9	159.7	148.8	201.6	173.1	141.6	113.2	154.4	131.8	88.6
Iron and steel	117.0	122.1	160.2	153.4	155.8	212.2	.....	.....	.....	.....
Metal working plants	68.5	85.8	76.6	82.7	80.5	103.8	.....	.....	.....	.....
Metals group	104.3	107.6	122.2	122.2	122.7	164.3	32.3	41.1	42.5	71.1
Forest products	44.6	66.0	55.7	64.6	66.0	93.1	122.4	128.9	128.1	145.7
Paper and pulp	96.6	132.0	133.8	137.8	149.2	135.0	110.6	130.1	114.3	116.0
Rubber	65.2	84.7	73.8	91.4	102.5	60.7	53.7	68.1	107.4	105.5
Shipbuilding	.....	.....	.....	.....	.....	.....	87.8	98.1	88.1	89.0
Stone, clay and glass	113.1	187.0	154.9	138.7	147.7	129.1	44.0	112.3	87.3	102.5
Textiles	102.8	111.7	111.7	104.3	92.5	85.7	.....	.....	.....	.....

Stone & Webster May Reduce Book Values

Directors of Stone & Webster, Inc., recently voted to recommend to stockholders an adjustment in the book value of the corporation's assets and capital to reflect depreciated values. In connection with the revaluation of investments it is proposed to reduce the present book value to January, 1932, levels of approximately $16,565,000 in certain miscellaneous investments and to reduce by $56,000,000 the book value of common stock of its utility subsidiaries, Engineers' Public Service Company and Sierra Pacific Electric Company, each to $30 a share. Also contemplated is the cutting of approximately $3,304,000 from the value of Stone & Webster investments in certain other subsidiaries.

As a result of these operations capital and surplus will be reduced to approximately $71,500,000, which is the equivalent of about $30 a share on the outstanding stock. Naturally the proposed adjustments will have no effect whatever upon the value of the corporation's assets, its capital stock or the number of shares outstanding.

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Columbia Gas & Electric Increases Its Capital

Stockholders of the Columbia Gas & Electric Corporation on January 14 authorized the creation of an issue of 250,000 shares of convertible 5 per cent cumulative preference stock, par $100. Two days later the directors announced a quarterly dividend of 37½ cents a share on the common stock, payable February 15 in the new convertible 5 per cent preference stock at par to holders of record January 25. The preference stock will be convertible at the option of the holder at any time within a period of five years after February 15, 1932, into common stock at the rate of one share of preference stock for five shares of common stock.

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Kansas and Kentucky Utilities Inaugurate Financial Programs

During the past week the first new offerings of securities of electric light and power companies since the beginning of the year appeared. Kansas Power & Light Company made an offering of first and refunding mortgage gold bonds, series C, priced at 9½ and interest, yielding more than 6.90 per cent, a piece of financing involving a total of $7,500,000. An interesting feature of the loan is that beginning March 1 next the company will deposit with the corporate trustee $42,000 monthly for the purchase or redemption of the bonds, which plan is calculated to be sufficient to retire the entire issue by maturity.

Kentucky Utilities Company issued first mortgage 7 per cent gold bonds, series J, to the amount of $2,000,000, at par and interest. These bonds will be dated February 1, 1932, and will mature February 1, 1957. Proceeds from the sale of these bonds will be used to reimburse the company's treasury for the cost of extensions, additions and betterments, and for other corporate purposes.

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Another Corporation Lowers Its Capitalization

An outstanding example of writing down capital in accordance with portfolio shrinkage is provided by the Hydro-Electric Securities Corporation, a Canadian enterprise. Common stock capital will be reduced by $26,808,895 and almost $10,000,000 of class B preferred shares will be canceled. Investments which were held at cost totaled $54,148,100 at the end of 1930, but have depreciated drastically since that time.

Receiver Appointed for Arizona Edison Company

M. E. Cassidy, former Assistant Secretary of State for Arizona, has been appointed receiver for the Arizona Edison Company, which controls water, power, gas and ice plants in six counties throughout the state.

The action followed the filing of a suit in the federal court by Loveland Engineers, Inc., San Francisco, one of the Arizona Edison Company's creditors, which alleged that the Arizona Edison Company is a subsidiary of the People's Light & Power Corporation, now in charge of a receiver, and that such condition has created widespread doubt in the minds of creditors as to the soundness of the subsidiary company. The federal court appointed a receiver on January 16 and he took immediate charge, having opened offices in the Home Building, Phœnix.

Another suit had been filed in the Superior Court by A. T. Kilcrease, a holder of one share of preferred stock of the Arizona Edison Company, who brought the suit on behalf of himself and other stockholders and also asked for a receiver for the company.

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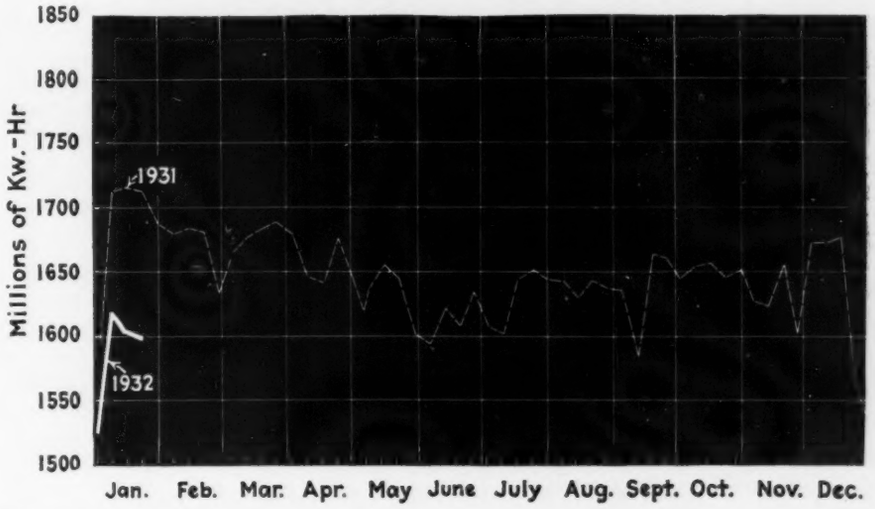
Output Again Under 1931



ENERGY production of electric light and power companies continues to fall short of operations a year ago. Output for the week ended January 23 was off 6.7 per cent compared with the corresponding week of 1931, according to the National Electric Light Association. This repeats the low record of the preceding week.

How much of the decrease is due to unusual weather conditions and how much to a shrinkage in industrial consumption cannot yet be stated. Regionally the percentages are about the same as those reported last week.

Weekly Output, Millions of Kw.-Hr.

	1931	1930	1929	1928
December 19	1,676	1,770	1,860	1,710
December 26	1,565	1,617	1,638	1,527
	(1932)	*(1931)*	*(1930)*	*(1929)*
January 2	1,524	1,597	1,680	1,542
January 9	1,619	1,714	1,816	1,734
January 16	1,602	1,717	1,834	1,737
January 23	1,598	1,713	1,826	1,717

Per Cent Change from 1931

Region	Week Ended Jan. 2	Jan. 9	Jan. 16	Jan. 23
Atlantic seaboard	—1.7	—4.1	—2.6	—2.6
New England alone	—2.0	—2.6	—2.8	—2.5
Central industrial	—7.0	—7.8	—9.4	—9.5
Chicago district	—4.4	—4.1	—6.4	—8.5
Pacific coast	—7.0	—8.8	—7.4	—7.3

GERMANY ADOPTS SUPERSIGNS

By an ingenious method of suspension, involving a widely meshed wire net on which are fastened electric lamps in any desired configuration, Germany has gone in for large and spectacular signs. This installation at the Goldenberg power station of the Rheinisch Westfalische Elektrizitätswerke involves letters 200 feet high. A visibility of twenty miles is claimed.

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New York Fixture Men Protest on State Work

Representatives of the Lighting Fixture Manufacturers of New York and of the International Brotherhood of Electrical Workers, under the spokesmanship of Herman Plaut, conferred with Governor Roosevelt of New York recently regarding state contracts for ornamental lighting fixtures. It was alleged by the representatives that when general and electrical contractors were given the business and orders were placed with manufacturers outside of New York State inferior results and hardship upon New York workers were involved.

It was requested that a committee consisting of representatives of the Department of Public Works, the manufacturers and labor unions be appointed to study and revise specifications for lighting equipment in New York State projects to the end that New York manufacturers shall be in a position to estimate and contract for such work for the best interests of all concerned and that contracts shall be advertised for and let direct to reputable manufacturers of lighting equipment.

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Seek American Standard for Manhole Frames and Covers

A proposal for an American standard for manhole frames and covers containing recommendations for thirteen types of frames and seven types of covers to replace the thousands of types now in use has just been published by the American Standards Association. The demand for innumerable different designs and sizes of openings for manholes by the various public utilities and municipal supply departments which make use of manholes for their underground pipes and lines has caused many difficulties in manufacture and replacement of manhole frames and covers.

The present concerted effort to standardize on a few sizes and styles is the result of these difficulties. Since 1924 a technical committee has been working on the subject under the procedure of the American Standards Association, going through a long process of elimination, selection and redesign.

The committee is now circulating a questionnaire to all those concerned with the production and use of manhole frames and covers to determine whether producers and users find the recommendations satisfactory or whether they wish to make suggestions for changes. The diversity in usage at present is seen from an estimate that in one city alone having a population of about 500,000 there are at least 100 different types and sizes in use. A single foundry in another city reports that it has about 2,000 different sets of patterns for manhole frames and covers, and nearly 600 of these sets of patterns are listed as being active at the present time.

Among those represented on the committee studying the situation are the American Society of Mechanical Engineers, Association of Edison Illuminating Companies, National Electric Light Association, National Electrical Manufacturers' Association, Postal Telegraph Cable Company, Western Union Telegraph Company and the United States Department of Commerce.

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Baltimore Consumers Taking More Energy

An increase of 10 per cent in the average amount of electrical energy taken by domestic consumers more than offset the loss of revenue due to the decrease of industrial power sales by the Consolidated Gas, Electric Light & Power Company of Baltimore for 1931, as compared with 1930, states Herbert A. Wagner, president.

The company for several years has been carrying on an aggressive campaign to encourage the use of labor-saving devices and electric refrigeration in the home. The campaign has been unusually successful and has added substantially to the company's domestic load. The fruits of these campaigns were clearly evident last year, when both gross and net revenues showed slight gains over 1930, despite the fact that the average rate for domestic consumers was lower in 1931.

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North American to Spend $19,000,000 for Construction

Construction budgets for 1932 of public utility subsidiaries of the North American Company will amount to around $19,000,000, according to an announcement by President Frank L. Dame.

"Though some of the expenditures in-

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Delinquent Electrical Accounts

(National Electric Credit Association)

Number of Accounts Reported

Division	December 1930	December 1931	Per Cent Inc. or Dec.	Twelve Months 1930	Twelve Months 1931	Per Cent Inc. or Dec.
New York	249	226	— 9.2	3,323	2,837	—14.6
Middle and Southern Atlantic	97	127	+30.9	1,796	1,392	—22.5
New England	108	97	—10.2	1,376	1,119	—18.7
Central	611	546	—10.6	8,259	6,623	—19.8
Total	1,065	996	— 6.5	14,754	11,971	—18.9

Total Amounts Reported

	December 1930	December 1931	Per Cent Inc. or Dec.	Twelve Months 1930	Twelve Months 1931	Per Cent Inc. or Dec.
New York	$35,491	$24,376	—27.2	$507,882	$352,658	—30.6
Middle and Southern Atlantic	31,068	17,378	—44.0	290,591	173,725	—40.2
New England	11,690	5,549	—52.5	173,761	92,498	—46.8
Central	74,101	47,858	—35.4	1,040,251	591,488	—43.1
Total	$150,350	$95,161	—36.7	$2,012,485	$1,210,369	—39.8

cluded in the total estimate will depend upon current business developments," Mr. Dame said, "this amount is for work definitely planned for completion or in progress during 1932. In 1931 construction expenditures aggregated approximately $40,000,000, including completion of the large Osage hydro-electric development in Missouri, and in 1930 totaled $70,000,000. While we have greater generating and distribution capacity than required under present depressed conditions, continuance of the growing demand for residential service and resumption of industrial activity will necessitate increases in these facilities. We are therefore following our long-established policy of anticipating the public demand for service, deriving at the same time the benefits of lower material prices, greater and more efficient labor supply and avoidance of overtime and other excess costs usually attendant upon having to complete an extensive construction program in a brief time."

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New York Metal Prices

	Jan. 20, 1932 Cents Per Pound	Jan. 27, 1932 Cents Per Pound
Copper, electrolytic	7.25–7.50	7.25–7.50
Lead, Am. S. & R. price	3.75	3.75
Antimony	6.00	5.90
Nickel, ingot	35.00	35.00
Zinc, spots	3.35	3.25
Tin, Straits	22.25	22.00
Aluminum, 99 per cent	23.30	23.30

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Pacific Coast Electric Market Expands

A total electric market of $52,975,000 to be developed during 1932 in northern and central California was forecast by R. E. Fisher, vice-president of the Pacific Gas & Electric Company in charge of public relations and sales, at the annual industry meeting for the year sponsored by the Pacific Coast Electrical Bureau and held in San Francisco on January 6. The forecast was made during the presentation of the power company's business development program for 1932.

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Process Heating Conference

Powdered coal for process heating, present types, uses and unit costs of refractories, heat insulation material for industrial furnaces, applications of small electric heating units, induction furnaces, electric arc furnaces, control of atmosphere in electric furnaces and the economics of electric furnaces as compared with fuel furnaces are among the topics to be discussed at the process heating conference set for February 10-12 at the Case School of Applied Science, Cleveland. Dr. W. R. Veazey, head of the chemical engineering department at Case, is general chairman of the conference.

Electrical Manufacturing Supported by Home Electrification

WHETHER activity in electrical manufacturing establishments increased in December or decreased, compared with November, depends on the interpretation one chooses to put on the statistics. Both optimists and pessimists can find support for their respective mental attitudes.

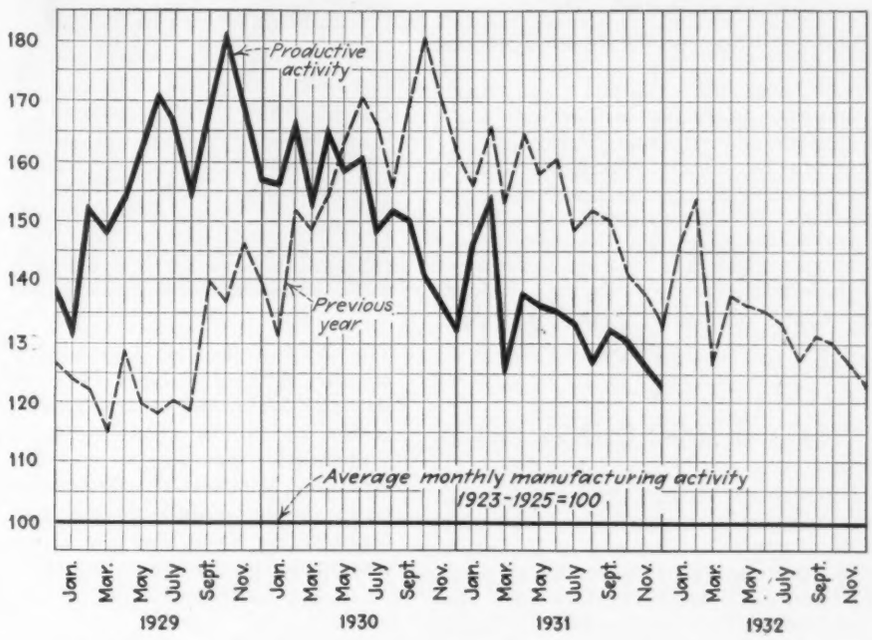
Comparing total energy consumption in November and in December by plants for which data are regularly received by the ELECTRICAL WORLD, and using these figures as a measure of total production, December exceeded November operations by 8 per cent. But this takes no account of the fact that of the 30 days in November five were Sundays, with allowances to be made also for election day and Thanksgiving, while of the 31 in December only four were Sundays and one a holiday.

When these differences are taken into account the resulting index for December is 2.7 per cent less than that for November, both being adjusted for the number of working days. These adjusted values are the ones used in the accompanying table and chart.

But December activity in this industry usually falls off materially from November; with a further adjustment for this seasonal variation the index for the later month is 3 per cent higher than for the earlier. That is, the seasonal decrease has been smaller than usual.

From another viewpoint, too, there appears to be a tendency toward leveling up. Compared with 1930, December of 1931 was down 6.7 per cent; November was down 7.7 per cent, September 11.6 per cent.

The returns indicate that the decrease from 1930 can be ascribed largely to reduced sales of industrial equipment, rather than to any material decrease in smaller goods, such as appliances. This merely corroborates what is a matter of common knowledge: manufacturing in most lines is at a low ebb, and has lately called for but little new equipment, while household electrification continues rather briskly.



Index of productive activity in electrical manufacturing plants in the United States

Base: Average monthly activity during 1923-1925 = 100

All data have been adjusted for differences in number of working days, but not for seasonal variation.

Monthly Index of Electrical Manufacturing Activity

Adjusted to 26 working days

Base: Average Month, 1923-1925

Month	1929	1930	1931
January	131.3	156.2	146.6
February	151.8	165.2	154.3
March	148.3	153.0	126.1
April	154.6	164.9	138.1
May	163.5	158.0	136.7
June	170.5	160.2	135.2
July	166.6	148.5	133.4
August	155.4	152.2	126.9
September	168.8	150.0	132.6
October	180.6	140.6	130.4
November	169.5	137.5	126.9
December	157.0	132.4	123.5

Housecleaning Planned for Patent Department

The Patent Department is going to have a new lease on life if a bill now in course of preparation becomes law. Representative William I. Sirovich, new Democratic chairman of the patents committee of the House of Representatives, plans to give the patent law a thorough renovating. An extended series of hearings from January 20 to March 1 is under way, and the hope is expressed that industrial executives and patent counsel of large corporations will appear.

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South Carolina Rate Inquiry

As an outcome of the South Carolina legislative investigation reported last week (page 164), the five large power companies operating in that state have been ordered by the State Railroad Commission to submit within 20 days a statement of their rates based upon the findings of the investigators. The Duke Power Company, the Southern Public Utilities Company, the Broad River Power Company, the Carolina Power & Light Company and the South Carolina Power Company are those concerned.

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Campbell (Mo.) Decision Upheld

Affirmation has been given by the United States Circuit Court of Appeals at St. Louis to the decision of a lower federal court that the city of Campbell, Mo., exceeded its bonded indebtedness by entering into a contract with the Fairbanks-Morse Company to install a municipal power plant to be paid for in large part from earnings (ELECTRICAL WORLD, April 4, 1931, page 622). A new agreement with the manufacturing company which will obviate discontinuance of operation is sought by the city, whose authorities had also tried unsuccessfully to cancel the local franchise of the Arkansas-Missouri Power Company.

▼

Ford Hydro Company a Utility

Reversing the judgment of a lower court, the Wisconsin Supreme Court has sustained the contention of the Ford Hydro-Electric Company, operating in Florence County, Wis., that it is a public utility and therefore entitled to recover a property tax of $10,000 assessed against it by the town of Aurora which it paid under protest in 1929. Town officials said the company was operated merely to furnish power for the Ford plant at Iron Mountain, Mich., and that the power company had refused to serve the residents of the county and had not filed a schedule of rates with the state commission. This the company disputed, saying that its offers to furnish power to residents in the county were turned down.

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LINK WITH FARADAY BROKEN

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The death at London last Sunday of Sir Alfred Yarrow, famous British shipbuilder and engineer, at the age of 90, removes in all probability the last man who attended Michael Faraday's lectures in the middle of the last century. He was a liberal contributor to the promotion of scientific research.

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New Hydro Plant for Yadkin River?

Representatives of Salisbury, High Point, Winston-Salem, Statesville and Lexington, N. C., and of an unnamed New York company met recently at Salisbury to discuss building a six-million-dollar 30,000-hp. hydro-electric plant on the Yadkin River of which the communities would agree to become wholesale customers. Assurance of support by the five towns and by Concord, which was not represented, would be the signal for an immediate start on the project, it was reported.

▼

More Contention in Seattle

Seattle's City Light Department will again be an issue at the city elections in March. J. D. Edwards, the Mayor who was recalled last year after he had dismissed Superintendent J. D. Ross, is again a candidate and has staged an attack against the department as extravagant and wasteful, to which Mr. Ross has replied in detail, blaming the former Mayor himself for liabilities of $1,250,000 "wished on us."

Inflated Construction Costs

Legislative action to prevent the alleged practice of public utilities in padding construction costs as a basis for increasing rates was discussed by the Associated General Contractors of America in convention at Milwaukee last week. E. J. Harding, general manager of the association, said: "The utilities have used subsidiary companies or directly controlled construction organizations to pad the costs. It is impossible to stop the practice as long as they continue to have their work done by day labor through their own organizations. Our association has taken the matter up informally with the Interstate Commerce Commission."

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Ultraviolet Helps the Dairy

An experiment to extend over the winter season of 1931-32 is under way at the Lycoming County (Pa.) farm of S. L. Nicholson & Son to ascertain whether treating cows with ultraviolet radiation will result in a milk of high vitamin D content. The G-1 ultraviolet lamp is suspended in an 11-in. aluminum reflector 2 ft. over the back of each cow. The installation, operated all day in winter, will also be used during milking time morning and evening when the herd is at pasture.

▼

Tacoma Situation Adjusted

A 25-year franchise has been granted, after much negotiation, to the Puget Sound Power & Light Company to operate its power lines through Tacoma, Wash. The company is forbidden to sell power in Tacoma, except for street-railway use, but will maintain interconnection with the city for emergency purposes. The agreement stipulates that the private utility company shall turn over the customers it is now serving in the city. The municipal plant and the Puget Sound company will jointly use certain lines, and all others will be removed.

▼

Springfield, Ohio, a Battleground

With a self-avowed "anti-utility" city administration in power at Springfield, Ohio, since January 1, first steps in a campaign against rates have been directed against the price of gas. They will be followed by an investigation of domestic light and power rates "with a view to ascertaining if they are not unreasonably high." They are 8½ cents for the first 30 kw.-hr. a month, 6 cents for the next 30 and 3 cents for all in excess, with no service charge. Domestic power rates are 3 cents flat per kilowatt-hour with a minimum charge of $2 a month. The utilities will fight reduction.

Cathode-Ray Records Selectively Sensitive

A method of making cathode-ray records sensitive only to that form of invisible ray and indifferent to visible light rays, thereby permitting daylight handling of films, has been developed by the Bureau of Standards.

Where the properties of cathode rays are studied, methods of detecting and registering these invisible rays are necessary. Electrical methods are usually tedious, and photographic methods require darkness in order to avoid fogging the plates. The new method of registering cathode rays is analogous to the photographic method and can be carried out entirely in daylight, since no development process is required. For this purpose thin metal films of lead, silver, bismuth, tin, cadmium, arsenic, copper, antimony, zinc, magnesium and selenium are deposited on glass by evaporation from a coiled tungsten filament in vacuum. These are then exposed, in vacuum, to a beam of 10 kv. cathode rays. Films of lead and tin so thin as to be quite transparent before exposure, may be darkened to a density of the order of 0.5 by exposure to 0.01 coulomb/cm^2. Opaque films of the above metals when exposed to the vapors of various acids (hydrochloric, nitric, hydrobromic, hydroiodic, hydrogen sulphide and sulphuric) acquire a lowered opacity, the films in many cases becoming quite transparent. Exposure to cathode rays tends to restore the original opacity. In general, the best effects have been obtained with nitrates and bromides, which show the most promise as to sensitivity and permanence of the record. The cathode-ray bombardment causes virtually all the films to fluoresce, the color and intensity of the fluorescence depending on the material.

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Television on a Light Beam Predicted by Alexanderson

Television transmitted on a beam of light, utilizing a wave length of only billionths of a meter, has been successfully demonstrated at Schenectady by Dr. E. F. W. Alexanderson in the radio consulting laboratory of the General Electric Company. This use of light waves, Dr. Alexanderson believes, opens the way to a new and valuable era in the art of broadcasting and promises to result in more distinct television pictures.

In the laboratory tests the pick-up device was of the conventional type, such as used by Dr. Alexanderson in his previous television experiments. Instead of the electric impulses being fed into a radio transmitter as heretofore, they were modulated into high frequencies on a light beam from a high-intensity arc. This beam was projected the length of the laboratory into a photo-electric tube which transposed the modulated light waves back into electric waves. The electric impulses reproduced the image by means of an ordinary television receiver.

"The work thus far is highly experimental, yet some day we may see television broadcast from a powerful arc light, mounted atop a tower high above the city," Dr. Alexanderson said. "These modulated light waves will be picked up in the homes by individual photo-electric tubes instead of by the present-type wire antennas.

"When it was decided to take up experimentation on this subject," he went on, "Dr. Irving Langmuir of the research laboratory was consulted about the probabilities of being able to modulate a source of light at the required high frequencies of from 100,000 to 1,000,000 cycles. Dr. Langmuir, who has done much research work with arcs, believed that this could be accomplished by using a high-intensity arc. It was concluded that a most desirable light would be a high-intensity arc of the type where the light comes from the arc rather than from the crater. In the 10-amp. arc lamp used for the first test most of the light was from the crater, and comparatively little was in the arc. The lamp was used in such a way that the light from the crater was eliminated, and the arc used was therefore quite a weak source of light. The current from our standard television pick-up was superimposed upon this arc, and the light from the arc was intercepted by a photo-electric tube at a distance of 130 ft. A photo-electric tube was then used to control our regular television projector. The television image transmitted in this way had the same sharpness of detail as the one ordinarily obtained without the interposition of the light beam."

▼

Complete British Railroad Electrification Unlikely

Sir Herbert Walker, chairman of the British Railway General Managers' Conference, says concerning the outlook for electrification in the United Kingdom:

When conditions do improve and the financial position is such as to warrant development in the railroad industry, it is almost certain that the electrification of railroads will be proceeded with, but it is most unlikely that this will take place in the wholesale manner foreshadowed in the report of the Weir committee. The capital expenditure suggested by this report is too heavy to be borne by the companies and the return which is likely to accrue from such an expenditure too nebulous. Railroad companies will probably proceed with the electrification of those sections of their systems which should lend themselves to this method of operation and where electrification is likely to produce a sufficiently large increase in traffic to justify the cost.

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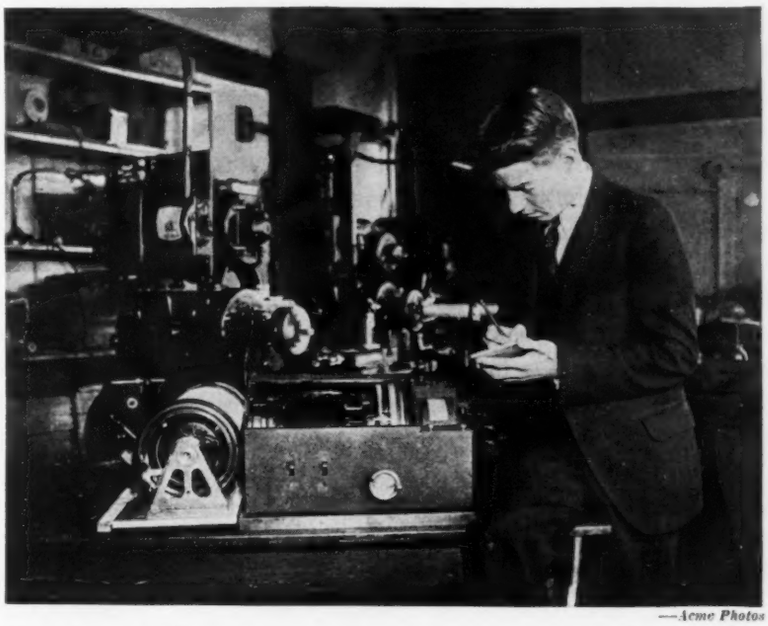
KENNELLY-HEAVISIDE LAYER FORCED TO REGISTER



—*Acme Photos*

The Kennelly-Heaviside layer is ever changing its height. The Bureau of Standards has devised a machine to record these changes, and it asserted that by transmitter combinations the fading of radio reception may be continuously avoided.

EDITORIALS

L.W.W.MORROW
Editor

Municipal utilities and taxation

CLAIM is often made that municipalities can apply profits from operation of an electric utility enterprise to reduce the tax burden. The "tax-free" city is the dream. But it takes careful accounting to establish the right of unexpended receipts to be classed as profits, in whole or in part, which can be applied toward reduction of taxes. At this point it is unfortunate that the municipalities in general do not conform to the accounting technique prescribed for the railroads and other utilities. Nevertheless, skilled accountants can realign the fiscal data so as to disclose the true degree of profitableness. Then it often transpires that profits vanish and operating losses come to plague the tax-free dreamers.

Such an analysis has been made of Florida municipal utilities by an engineer who is consultant to the utilities division of the Florida League of Municipalities. Certainly no unfriendly bias need be feared from a source so close to the temper and to the facts. Candid disclosure of the conclusions elsewhere in this issue reveals that Florida householders and industries are paying much more than the national average prices for their electric service. Bringing the comparison nearer home, the users are found to be paying considerably more than they would pay as consumers of large private utilities in adjoining states. Could those rates be made available to them, it would mean a saving which would be equivalent to tax reductions of from 2.2 mills to more than 18 mills.

Admittedly Florida has a dual problem which is a residual of the collapse of its real estate boom. The utility properties were expanded along with general civic betterments in contemplation of growths in population and taxable realty, which, however, lacked permanence. The problem now is to support the burden on contracted wealth and capacity for governmental revenue. Special in a measure as the cases are, nevertheless they supply ample refutation of the assertion that municipal utility ventures are preordained to afford lower electric rates and lower net cost of government than those which prevail in communities served by private enterprise. Accurate municipal accounting should make it possible for municipalities to tell the real facts about the profitable operation of electric service systems.

Kill kilowatt-hour taxation now

IN THE public interest the electric industry should take action to make clear just what heavy taxation on energy sold would mean. The half-cent tax per kilowatt-hour first proposed in the House ways and means committee would cast a burden of $350,000,000 on electric utilities and their customers and stop all electrical progress in this country. It was suggested by some congressmen that provision be made that this tax be not passed on to customers—an impossible thing, because the net earnings of the utilities are only about $125,000,000. The proposed tax is 16 per cent of the total gross revenue of the industry. It would bring an increase of 50 per cent in the direct operating expenses of light and power companies. Bankruptcy would result if this tax bill were adopted with the provision that it could not be passed on to customers, and it is inconceivable that such a provision would be sustained in the federal courts.

But what would $350,000,000 in added taxes mean to customers? It would mean that each manufacturing plant and power customer would have his electric rate increased 35 per cent. The

average bill of the 621,000 power customers would increase from $890 per year to $1,195. It would mean that every office, store, hotel and commercial lighting customer would have his rate increased 12.5 per cent. Each of the 3,600,000 commercial customers would pay an average increase of $19.50 per year for electricity. It would mean that each of the 20,000,000 domestic customers would have his rate increased 8.6 per cent, or an average of $3 a year.

Beyond the dollars in direct bill increases there would be the blow inflicted on a major business enterprise. All appliances and apparatus would suffer in sales, and this annual sales volume is now $2,000,000,000. Electricity and electrical apparatus are indispensable aids to industry and to the homes. There is no substitute for them. This tax would undermine the entire social and business structure of America. It is pernicious, confiscatory and discriminatory. It originated in minds that are utterly ignorant of the industry and of what the effect of the tax would be.

What can be done? We suggest that every utility in every locality show its customers by means of newspapers, speeches and direct mail matter what this tax, and in less degree a 5 per cent tax on energy sales, would mean applied to the local company and the local customers. Tell the facts and the wires to Washington will hum with messages. Action of this kind is an open and honest shouldering of their responsibilities by utilities. Now is the time to act and not after a crushing bill is passed by Congress.

Foreign trade plays minor part

ALLEGED imminence at various times recently of economic collapse abroad was cited by a stock market analyst as justification for even lower prices for certain electrical manufacturing company stocks. Such statements reflect the abnormal importance popularly attached to foreign business—a viewpoint not particularly designed to facilitate the revival of confidence.

The export business of this country from all industries is loosely placed at 10 per cent of all business transacted. But of electrical products totaling $1,314,000,000 last year exports amounted to around 7 per cent. In net profits the proportion is much smaller. Estimates have been made that net profits from foreign business do not normally constitute more than 2 or 3 per cent of our national income. Furthermore, reverting to the electrical products field, our largest single market for electrical products outside the United States is Canada, a country quite as sound as our own economically.

Danger of economic chaos abroad, remote as is such a possibility, is a transparent myth when viewed as a justifiable major deterrent to business recovery. Yet it is an important item in the lack of confidence which has done so much to paralyze business.

Trends in intercontinental radio telephony

THANKS to recent advances in intercontinental transmission and reception, world telephony has just entered a stage of integrated development and co-ordination with intracontinental wire systems which is of interest to engineers everywhere. Speaking before the Lowell Institute recently at Boston, Dr. Ralph Bown of the Bell Telephone Laboratories pointed out that the technique of the transoceanic radio-telephone art permits the conception of a central radio telephone station able to work in almost any direction and connecting with other stations scattered over the world to set up connections between telephone users near such stations, as required. Poetically speaking, the ether would become the switchboard and the radio waves the operator's cords. Practical considerations, however, point to the more economical solution of such problems by a world network formed by interconnecting radio links, trunk routes of business communication and existing and improved land systems.

Short radio links pieced end to end with wires appear to be the ultimate method of connecting widely separated points, except, as in the case of Australia and London, where a great community of interest exists even between antipodal centers. It is more economical to handle the occasional call from the mid-Pacific, for instance, to another outlying point like Bermuda through relay or tandem connection through trunk routes to some center where a circuit to the objective is available than to design transmitting and receiving stations for multi-radial long-distance work.

The effect of future transoceanic cable telephony upon world-wide facilities now available for

radio telephony in conjunction with land lines remains to be studied. Dr. Bown did not discuss international radio broadcasting in the limited time at his command, but it would seem probable that the advance of the art in later years at any rate might envisage improvements in service to some degree comparable to those effected by the chain hook-ups of the present continental United States, provided costs are not too great.

Industry co-operation has broken down—what next?

AFTER nearly twenty years of agitation and effort, national co-operation between the major branches of the electrical industry has broken down. In theory it was to have centered around the directorate of the Society for Electrical Development, where the heads of the national associations could meet, not as suppliers and customers, but as recognized leaders of thought in the national organizations of electrical men. Here the public opinion of the industry could be expressed and policies of any one association affecting matters of common concern could be checked against the viewpoint of the other three. Here unified support could be marshaled behind constructive programs for broad industry progress.

This theory received its severest test five years ago when an industry sales conference was held to work out a co-operative program for the development of the domestic market. Delegations officially representing the four major associations produced a plan which they agreed upon. But it was wrecked by one group for reasons which to the other three seemed unco-operative. Men who believed in give as well as take said, "What's the use?" Since then industry harmony has been running down hill, jolted by successive bumps of discord between associations, until the S.E.D. lies at the bottom, apparently quite dead by strangulation. What next?

The individual associations naturally have been busy about their own affairs. Each has gone its own way. But one spectacular development has been seen in the affairs of the electrical industry that concerns all these associations. It is the growing power of the non-electrical merchant over the market for electrical products. It has been seen in the widespread attack on power-company merchandising and in the increasing proportion of electrical appliances that are sold by other than electrical men. In a word, control in the marketplace is passing to the merchants that have the established contact with the home. It is a new phase but a natural one. In fact, it holds great promise for the industry in future growth.

But it also indicates a new relationship in which all branches of the industry must work together—for co-ordination, for development and for protection. It suggests a new reason why co-ordination is necessary between the major national associations. It supports again the belief which many men have held through the past contentious years, that if the S.E.D. is thrown away, some other council of the industry must soon be organized.

Straightening a vicious circle

PROGRESS in rural line extensions desired by farmers is too often obstructed by a vicious circle whose radius is a measure of economic maladjustment or perhaps misunderstanding as between power companies and their would-be customers of the basic elements of success in such ventures. According to Samuel Ferguson, the unsatisfactory situation arises as follows: First, the power company makes a relatively large investment to serve the farmer; second, the service is novel, and commonly the farmer uses only a little lighting; third, because of small use the price of electricity has to be high in order to pay interest on the line, and, fourth, because the price is high the farmer cannot afford to use more than a minimum of energy. As a result both parties are dissatisfied. The company thinks the farmer wants something for nothing, and the farmer suspects that the company wants to rob him.

When all the facts are known, the vicious circle is wholly unnecessary, and both parties work back to the inescapable final answer to the rural service problem—liberal use at a low price. Fortunately, the service opportunities on the farm are numerous and extensive. A large body of experience is now available to point the way toward widespread use of electricity on farms of every type, and research work fostered by the power companies, manufacturers and agricultural colleges promises more and more worth-while applications.

William Alton Jones

PAST-PRESIDENT of the National Electric Light Association, first vice-president of the Cities Service Company and since 1925 chairman of the executive committee of Henry L. Doherty & Company, William Alton Jones is one of the youngest of the chief executives of one of the largest public utility organizations in the United States. Still in his thirties, he is a director or officer in more than a hundred subsidiary Doherty corporations, among which are the Ohio Public Service Company, Toledo Edison Company, Public Service Company of Colorado, Cities Service Power & Light Company, Empire Gas & Fuel Company, Gas Service Company and Crew Levick Company. He is looked to for advice, for decisions on complicated problems and for the formulation of policies, and the amount of work he accomplishes has been termed prodigious.

One of Mr. Jones' chief assets is his ability to make friends and win the confidence both of his associates in the organization and of the outside business executives with whom he comes in contact. He is an authority on public utility problems, a subject in which he became interested when a student at Vanderbilt University at Nashville, Tenn. He is one of the best-posted men in the utility field on industrial research and economics. Because of his activities in the National Electric Light Association and the service he has rendered in its councils, Mr. Jones was elected a vice-president of the association in 1927. In 1930 he became president.

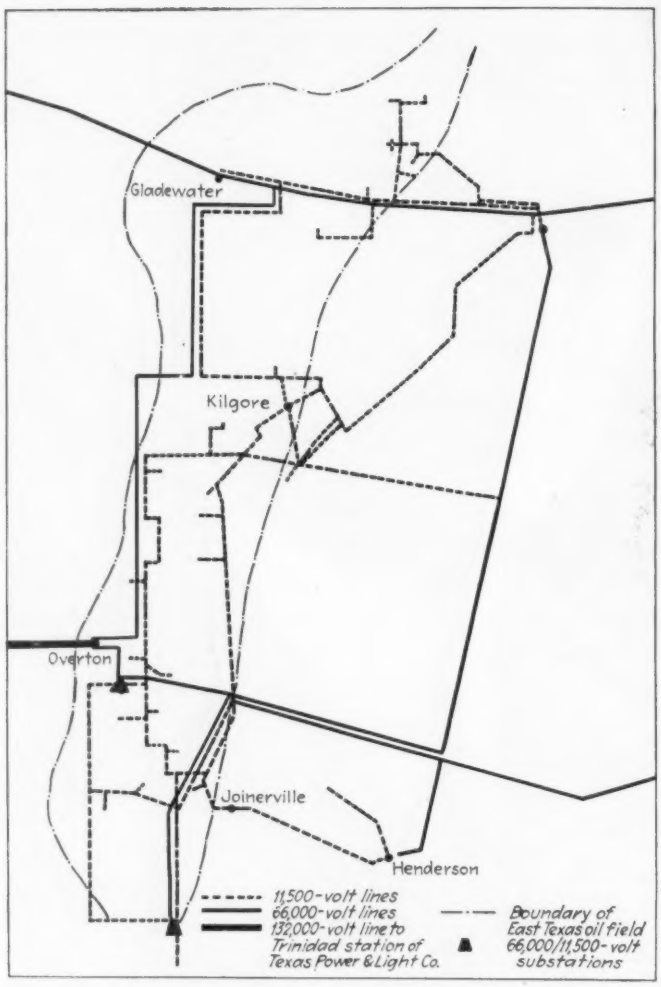
Mr. Jones, who was born in Webb City, Mo., went to New York in 1921 from Joplin, Mo., where he was treasurer of the Empire District Electric Company, to become assistant to the late Frank W. Frueauff, chief executive of the Cities Service Company under Mr. Doherty. Such was the ability he displayed in performing his work that upon the death of Mr. Frueauff in 1922 Mr. Jones was assigned to some of the duties hitherto performed by that executive. Possessing a keen, analytical mind, a broad comprehension of the possibilities of the development of the properties composing the Cities Service Company and the ability to get things done, Mr. Jones was soon recognized by his associates as a leader. His elevation to the position of first vice-president was a public expression of Mr. Doherty's confidence in him.

East Texas Oil Field Demanded Electricity

Utility kept itself in close touch with field developments and sold electric service.

Line construction and capacity interconnections anticipate oil producers' demands.

Special oil field office established.



Local system serving east Texas oil field

"PHENOMENAL" is the word that oil men use in referring to the east Texas oil field, which in August, 1931, only seven months after its discovery, was classified as the largest field in the world. For the week ended August 15 the average daily output was 738,035 barrels from 1,600 producing wells, ten times the production of the next largest field in the United States. The same adjective might be as fittingly applied to the growth of electric service in the field. The Southwestern Gas & Electric Company supplies energy to 50 towns in east Texas. All of these towns together consumed 1,312,733 kw.-hr. in July, 1930. In August, 1931, the newly discovered field was taking energy at the rate of 8,250,000 kw.-hr. per month—6.3 times the figure just named and twice as much as was taken by the city of Shreveport itself, with its 76,000 population. In August the field had established a maximum demand of 13,900 kw. at a load factor of about 80 per cent on a contracted total load of 31,400 hp. Of course, when Governor Murray used state troops to shut down oil production in Oklahoma and Governor Sterling followed his example in Texas, the wild growth of these figures was summarily checked. But the transformation of an electrical system that seven months before had been a scattered collection of low-voltage rural lines serving a number of sleepy villages into a close-knit high-tension network with ample power reserve had been accomplished.

As soon as it was realized that east Texas had a large potential oil field the power company made contacts with the major oil companies, all of which indicated that their holdings in the new field would be developed. The power company then prepared for additional substations and extended its distribution system to provide facilities in order that service might be available when required by the oil companies.

Further contacts were then made with the oil operators, the power company explaining rates and policies and distributing maps of transmission and distribution facilities. Electric power was first required for the operation of gathering stations to pump the oil from the field to the loading racks and for pumps to lift the oil into the tank cars.

The major pipe-line companies soon began the building of trunk pipe lines, among the first being the Humble Pipe Line Company, the Gulf Pipe Line Company and the Magnolia Pipe Line Company. The number of trunk pipe lines has increased until today there are sixteen major lines taking oil from the east Texas field, with two additional lines under construction. The accompanying table shows the main pipe-line pumping stations in and near the east Texas oil field now served by the Southwestern Gas & Electric Company. The table also lists the stations using other than electric power. The total connected load in electric horsepower in main-line stations is 15,450 hp., as compared to 3,835 hp. in oil, gas and steam engines.

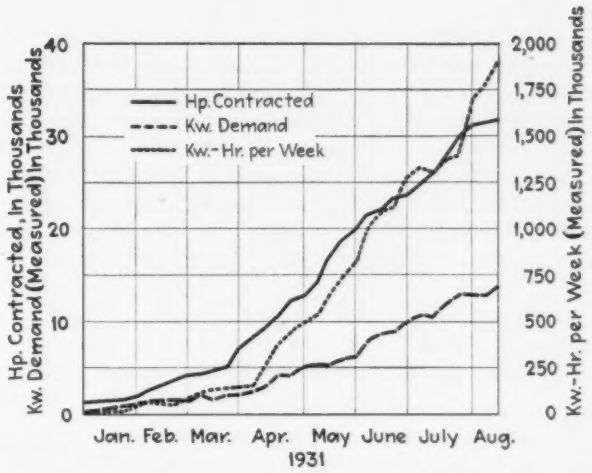
Oil is fed to the main-line stations of the trunk pipe lines by gathering systems of the various oil companies. Gathering stations are established throughout the field

Quickly—and Got It

By EDWIN VENNARD
Commercial Manager
Southwestern Gas & Electric Company, Shreveport, La.

in places where the oil will not flow by gravity. It is estimated that 80 per cent of these gathering stations are operated by means of electrically driven pumping units. Main pipe-line stations and gathering stations compose a large part of the total 31,400 electric horsepower contracted for as of August 15, 1931, the remainder being for miscellaneous power in oil refineries, machine shops, water stations, etc. These data are evident in the accompanying graph which shows the horsepower contracted for by weeks from the first of last year to August 15 and also indicates the actual kilowatt demand of the oil field proper, as well as the kilowatt-hour consumption per week.

The small communities in east Texas have experienced a growth in keeping with the new field. Longview, the largest town in the immediate vicinity of the oil field, had 1,275 electric customers in July, 1930, as compared with 2,200 customers in July, 1931. Kilgore had 119 customers in July, 1930, as compared with 909 in July, 1931. This general business activity in east Texas has also had its effect on the company's merchandise sales, ice sales and general lighting activities in this new territory.

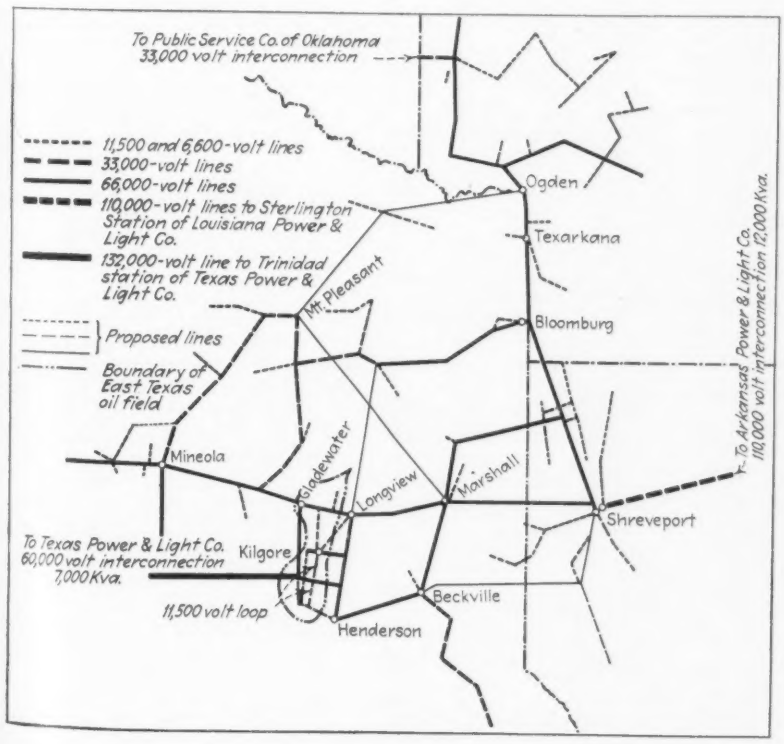


Growth of electric service in the east Texas oil field

When the activities started at Joinerville following the initial discovery the Southwestern Gas & Electric Company made a survey of the business and authorized an extension of a 2,300-volt rural line to give lighting service to the new inhabitants. Before the line was completed it was found necessary to increase the voltage from 2,300 to 11,500. While construction was under way on this line the Bateman discovery was made and it became necessary to strengthen the line from Longview to Kilgore. Before this was completed construction was authorized between Kilgore and Joinerville in order to close the 11,500-volt loop. Before this was actually completed it was found desirable to build a second 11,500-volt line between Joinerville and Kilgore approximately 2 miles west of the first line. Four major substations of 3,000-kva. capacity, from 66,000 to 11,500 volts, were built at Longview, Kilgore, Gladewater and Friars Switch respectively. Increased demands for power soon required that a 66,000-volt line be built from Longview through Beckville and thence to Friars Switch.

The extension from Kilgore to Gladewater was then completed, and further loops were made in order to assure maximum service and minimum of shutdowns through the action of automatic reclosing breakers. Later another 3,000-kva., 66,000/11,500-volt substation was built near Overton and additional capacity of 3,000 kva. was installed in the Friars Switch substation. The company recently completed another 66,000-volt line from the generating station at Shreveport to Marshall, which will enable delivery of more power to the field and will duplicate service facilities.

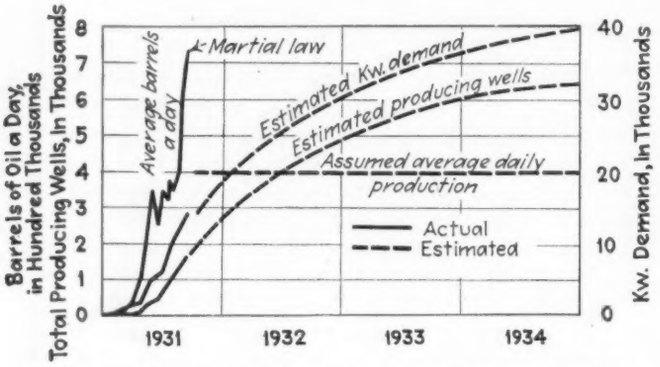
In order further to strengthen its position in supplying electric service to the oil field the Southwestern Gas & Electric Company has recently completed negotiations with two neighboring power companies for additional interconnections. One interconnection is



System of Southwestern Gas & Electric Company

from the west with the Texas Power & Light Company. This provides for the building of a 132,000-volt transmission line from the latter's Trinidad generating station to a point near Overton, where the Southwestern Gas & Electric Company is building a 25,000-kva. substation to transform this voltage to 66,000 volts. The other interconnection is on the east and is with the Arkansas Power & Light Company. This provides for the building of a 110,000-volt transmission line to Shreveport, which will provide a connection with the Sterlington generating station.

The main construction program also provides for the building of a 66,000-volt loop around the oil field. These facilities will provide sufficient power capacity to meet



Estimated future development of east Texas oil field

all demands of the oil operators, and the many major interconnections from different directions will assure the maximum continuity of service. By anticipating their requirements in east Texas the Southwestern Gas & Electric Company has been in a position to have electric service available to the oil companies as soon as oil-pumping equipment could be installed. This has contributed largely to the great demand for power now being made.

As a rule oil fields in the past have been in the vicinity of some one town served by the electric utility. In this way the electric company's office in the particular town took charge of the oil-field business. The east Texas oil field has presented a different problem because it is so large that it includes four offices of the Southwestern Gas & Electric Company—namely, Longview, Henderson, Kilgore and Gladewater. Some of the major oil companies have operations in virtually all parts of the field and do not want to be metered and billed through four different offices. This difficulty from an operating standpoint, as well as others, made it desirable to open an oil-field office to have jurisdiction over the entire field, and such an office has been opened with headquarters in Longview. In this office there are a manager, a bookkeeper, a meter reader, etc., and all records and accounts of the oil-field customers are kept there. Bills are made up in this office, whence they are sent to the general office for checking and thence mailed to the customers for payment.

Estimated future demand

In view of the many contingencies pertaining to the development of the east Texas oil field, it is naturally difficult to estimate accurately the future demand for electric power. The kilowatt demand of the field will be influenced largely by the prorated allowance yet to be set by the Texas commission. Other factors, such as gas pressure, price of oil, need of offsets, etc., will have their influence on the rate of development of the field and the demand for electric power. With certain assumptions, however, and by comparisons with other fields, it is possible to estimate the future use of electricity with a reasonable degree of accuracy.

There have been three attempts to prorate the field—the first making an allowance of 160,000 barrels a day. This was later raised to 190,000 barrels, then to 250,000 barrels, and the actual oil produced averaged 738,035 barrels a day the week prior to the shutdown by martial law. The estimates on the allowable output when the ban is lifted vary from 200,000 to 500,000 barrels a day. It is assumed that the output will average 400,000 barrels a day over the next three years. The major pipe-line companies have facilities already available to move more than 800,000 barrels a day. Based on a production of 400,000 barrels a day, this field will have a life of ten and a half years.

Approximately 65 wells are now being pumped. Many of these are using electric power, and it is probable that others on the west edge of the field will soon be on the beam. Probably the greatest demand for electric power will be made when it becomes necessary to pump the majority of the wells. It is estimated that it will require about 13 hp. to 25 hp. to pump wells on the beam. Even though not all of the wells utilize electric power, it may be estimated conservatively that the demand will climb to 40,000 kw. or higher eventually.

The east Texas oil field, now the largest in the world, is already to a great extent electrified. The most conservative estimates give a minimum potential of 1,300,-

Main Trunk Pipe-Line Pumping Stations

In east Texas oil field supplied by Southwestern Gas & Electric Company.

Pipe Line Company	Electric Hp.	All Other Hp.	Type Other Hp.	Remarks
Humble Pipe Line Co.				
Marshall station	1,600	.....	.....	.....
Arp station	1,040	.....	.....	.....
Gladewater station	480	.....	.....	.....
Bateman station	680	.....	.....	.....
Longview station	.....	1,225	Oil eng.	Engines transferred from another location.
Gulf Pipe Line Co.				
Whiteman station	1,000	.....	.....	.....
Fishman station	250	.....	.....	.....
Magnolia Pipe Line Co.				
Carthage station	1,500	.....	.....	.....
Kilgore station	.....	1,510	Oil eng.	Engines transferred from another location.
Texas Pipe Line Co.				
Reavers station	1,050	.....	.....	.....
Shell Pipe Line Corp.				
Kinsloe station	1,050	.....	.....	.....
Sun Pipe Line Co. and Yount Lee Oil Co.				
Troup No. 1 station	1,100	.....	.....	.....
Arkansas Pipe Line Co.				
Castor station	300	400	Gas eng.	
Hope station	500	.....	.....	.....
Atlas Pipe Line Co.				
Kilgore station	500	.....	.....	.....
Arnold station	500	.....	.....	.....
Norris station	250	.....	.....	.....
Longview station	.....	400	Oil eng	.....
Marshall station	.....	360	Steam	.....
Atlantic Pipe Line Co.				
Horton station	650	.....	.....	.....
Sinclair-Texas Pipe Line Co.				
Group station	1,500	.....	.....	Energy sold to Texas Power & Light Co., which company delivers to station.
King station	500	.....	.....	.....
Tyler Pipe Line Co.				
Overton station	450	.....	.....	.....
Liberty Pipe Line Co.				
Brightwell station	300	.....	.....	.....
Since station	1 250	.....	.....	.....
Total	15,450	3,835		
Total all types	19,285			

000,000 barrels of oil, while the more liberal estimates are as high as 2,500,000,000 barrels. Even at the rate of 400,000 barrels a day, it seems apparent that the field will be in existence for many years. Based on the present trend, the number of completed wells will continue to increase, and from all records on hand many of the major oil companies will continue to use the electric service available to them in increasing amounts.

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International Standard for Water Power

The advisability of standardizing the bases for computing water-power resources and the units for expressing them for statistical use was brought forcefully to the attention of engineers at the World Power Conference at London in July, 1924. At that conference it became obvious that the statistics on developed and undeveloped water power in the various countries were not comparable because there were no accepted standard rules for computing the power resources of a river or for stating the capacity of a water-power plant.

Subsequent progress in the direction of securing international uniformity is outlined in a recent article by N. C. Grover, chief hydraulic engineer, and W. C. Hoyt, engineer, both of the U. S. Geological Survey, published in a bulletin of the American Standards Association. It states that a sectional committee was organized under the sponsorship of the Geological Survey. According to the agreement reached by this committee in 1927, power estimates were to be based on gross head and 100 per cent efficiency. The kilowatt was to be the preferred unit. The agreement prescribed the following conditions for the rating:

1. Power based on natural flow available 90 per cent of the time. [See also D (a) below.] The 90-per-cent-time-flow is the flow occurring at the site 90 per cent of the time as determined in general by a study of the records of mean daily discharge.

Theoretical kilowatt $= H \times Q_{90} \times 0.08$.

Theoretical horsepower $= H \times Q_{90} \times 0.11$.

Where H = gross head in feet corresponding to 90-per-cent-time-flow.

Q_{90} = 90-per-cent-time-flow in second-feet.

0.08 and 0.11 = factors to give approximately 100 per cent efficiency.

2. Power based on natural flow available 50 per cent of the time. [The formulas correspond to those under item 1.]

3. Capacity of reservoir sites, above the lowest level of drawdown, expressed either in acre-feet or cubic-feet, that is reasonably probable of utilization, directly or indirectly, for increasing the power resources, together with an estimate of the resulting increase in power resources stated in such terms that a comparison may be made with the power resource obtained by rules 1 and 2 of the site or stretches of the river affected by the storage.

Developed sites—The rating of developed sites will show:

4. Power at the site to be determined in a manner similar to that for an undeveloped site.

5. Manufacturers' ratings of limiting machine capacities expressed in kilowatts.

This tentative American agreement was circulated among the national committees constituting the International Advisory Committee, together with a digest of such other rules and bases as were in use among the different countries. After three years of discussion the international committee, at a meeting held in Stockholm, July 4, 1930, made the following recommendations to the International Electrotechnical Commission:

(A) That the kilowatt be adopted as the unit of power.

(B) That either the foot or the meter be adopted as the unit of head.

(C) That the full power of the water and the gross head be used in the computations, showing in kilowatts the full theoretical power at 100 per cent efficiency.

(D) That the ratings be based on three rates of flow:

(a) Low rating, based on ordinary minimum flow, defined as the natural or present flow available 95 per cent of the time, or approximate equivalent, with a statement as to the month of occurrence of the low flow.

(b) Middle rating, based on medium flow, defined as natural or present flow available 50 per cent of the time, or approximate equivalent.

(c) Average rating based on arithmetical mean flow; but

(d) That it shall further be permissible to any country desiring it to report in addition ratings of Q_{75} and Q_{25} on the duration curve.

(E) That the rating of storage be based on the water capacity and the gross head and be expressed in terms of theoretical kilowatt-hours of energy in the water stored.

(F) That the rating of a developed site state the installed turbine capacity of the power plant expressed in kilowatts, and, in addition, that the rating of the site be made in the same manner as for an undeveloped site.

It is hoped and expected that the rules and bases recommended at Stockholm will soon be adopted by the International Electrotechnical Commission for use in international statistics.

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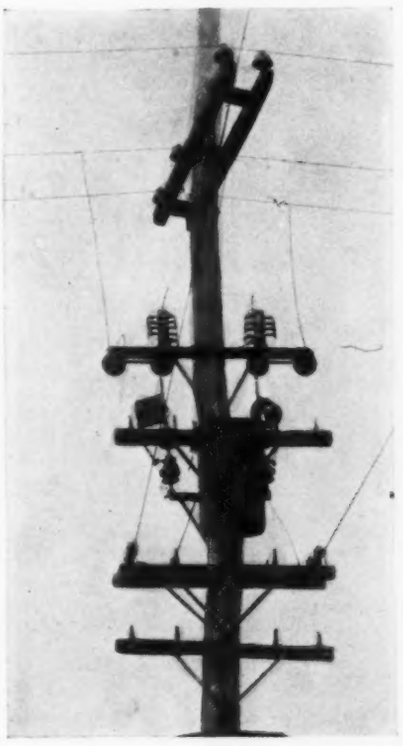
Low-Cost Pole Substation for Rural Community

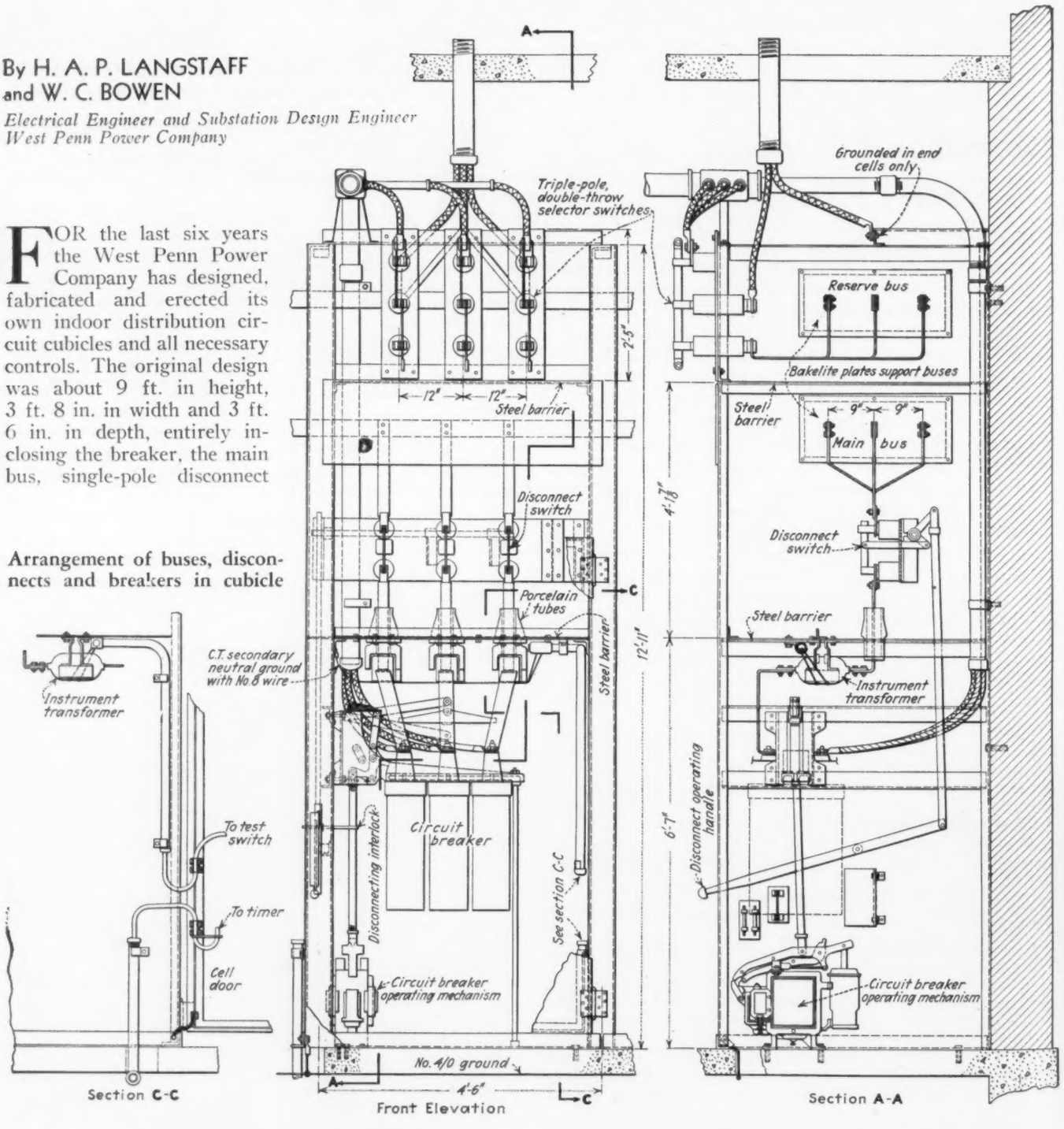


Fifty customers of the Central Connecticut Power & Light Company in the village of South Glastonbury are economically served by 2,300-volt, single-phase energy distributed from a 10-kva. transformer on a 35-ft. pole equipped with 13.2-kv. air-break and 2,300-volt plug switches, with lightning arresters and choke coils on the line side of the outfit. The estimated cost of the installation was only $300. As shown, the village energy supply is tapped off one phase of a through 13.2-kv. line traversing the rural territory.

West Penn Standardizes A.C.

By H. A. P. LANGSTAFF
and W. C. BOWEN
Electrical Engineer and Substation Design Engineer
West Penn Power Company

FOR the last six years the West Penn Power Company has designed, fabricated and erected its own indoor distribution circuit cubicles and all necessary controls. The original design was about 9 ft. in height, 3 ft. 8 in. in width and 3 ft. 6 in. in depth, entirely inclosing the breaker, the main bus, single-pole disconnect



Arrangement of buses, disconnects and breakers in cubicle

switches and instrument transformers. Breaker disconnects and bus were in segregated sections of the structure. The main strap copper bus was supported in slots in bakelite plates bolted to each partition wall between compartments, making a very rigid and highly insulated support, which formed a barrier between cells. Connections from bus to the breaker passed through porcelain tubes supported in the horizontal steel plates and then connected to the breaker terminals, adjacent to which were the necessary instrument transformers. The cell door was hinged to a vertical channel at the front of the partition wall and was interlocked mechanically with the breaker; the door extended sufficiently high to prevent the disconnects being opened before the door was opened. The auxiliary bus was mounted in the open, adjacent to the cell structure, and the instru-

Distribution Cubicles

ment and controls were mounted on ebony panels in the control room.

Improvements have been made from year to year and during the last year many installations have been made wherein the main and auxiliary buses, breaker, gang-operated disconnects and control fuses are all contained within the structure itself, thereby providing much more economical, safer and reliable installation for the control of 2.3-kv., 4-kv., 4.6-kv. and 6.9-kv. distribution circuits. These steel cell units are 13 ft. high, 4 ft. 6 in. wide, 4 ft. 4 in. deep.

In the upper section of the cell is the reserve bus and in front of it are the single-pole, double-throw selector switches, by means of which a distribution circuit may be transferred to the reserve bus so the main breaker or regulators can be released for servicing. Below the reserve bus is the main bus, the two being separated by a horizontal steel plate and both being supported by identical bakelite plates, as mentioned above. Below the main bus in the same section are the main three-pole, gang-operated disconnect switches, with their handles extending beyond the cell and interlocked with the door and breaker.

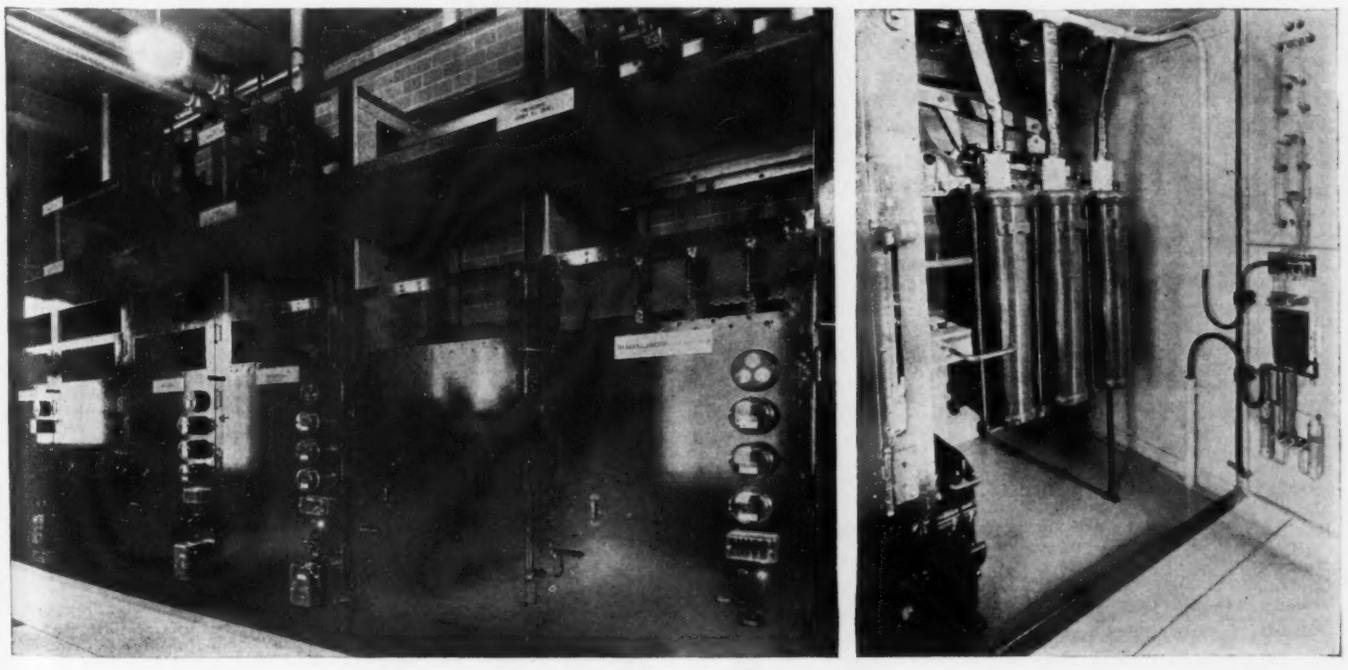
In the lower section of the cell is mounted the oil circuit breaker, operating mechanism, instrument transformers, interlocks and control fuses. On the door are mounted all of the relays, instruments, controls, auto-reclosing relays, signal lights, etc. The door, breaker and main bus disconnects are so mechanically interlocked that the breaker must first be opened before the main disconnects can be opened, and the latter must be opened before the door can be opened. An additional interlock also necessitates that the control circuit of the breaker be open, thus making it impossible to close the breaker or the disconnects after the door has been opened unless an additional release within the cell has been operated after the opening of the door, following the issuance of the necessary release tags by the proper authorities.

Ample space is provided in the breaker compartment for maintenance work on both sides of the breaker in all cases with the exception of the transformer breakers, the size of which usually reduces the amount of working space, but the inspection of these is so infrequent that the space can readily be limited.

The upper section of the steel door is provided with a screen which houses the disconnect switch compartment, making the same readily visible at all times.

Standard 15-kv. and 25-kv. breakers are used, depending upon the voltage and current requirements. Bakelite sheets used as bus supports are $\frac{1}{4}$ in. thick and have a dry flashover of approximately 80 kv. phase to phase, 50 kv. phase to ground and a wet flashover of 45 kv. phase to ground. The power wiring from the breaker to the regulators and to the line, which is housed practically throughout in conduit, has 7,000 volts insulation for all voltages 4.6 kv. and below and 8,000 volts insulation for 6.9-kv. service. This allows for standardization, with a considerable margin of safety. We have a large number of these units in service and have not within the last six years experienced a single bus disconnect or breaker failure witin the cells. The interior of the cells is painted a light buff color and the exterior a dark green.

The design is on a unit basis and any number of cells can be ordered and added to when desired. The steel is ordered already fabricated and is erected on the



Exterior and interior of switch cell

Note disconnect operating handle at left of each door and bent rods passing through slot in door. The door cannot be opened unless breaker and disconnect are open, and circuit breaker cannot be closed unless disconnect and door are closed. The flexible cable connections around hinged joint lead to instrument and control wiring on cell door.

job and all of the equipment assembled therein by our own organization.

This type of construction shows a material saving over any other type of cell structure. It is more economical and has more advantages than most other types of construction, such as truck type or metal-clad arrangements. It is extremely flexible, allowing for various changes in switches and wiring arrangements if necessary.

The outstanding advantages of this standard unit are as follows:

1. Extremely safe to the human being.
2. Installation is practically foolproof.
3. Economical structure from all points of view, especially space for all required equipment.
4. Economy in material construction and engineering costs. Much more economical and safer than brick or concrete and practically all other cell structure material.
5. Extremely flexible for servicing all equipment.
6. Extremely flexible for various or future changes when necessary.
7. Adaptable to various capacity breakers.
8. Very pleasing appearance.
9. No locks or keys are required.

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Correct Motor Voltage Will Reduce Power Bill

By L. F. LEUREY,
Consulting Electrical Engineer, San Francisco

Promulgation of power-factor clauses in electric rates calls for closer supervision of motor terminal voltages

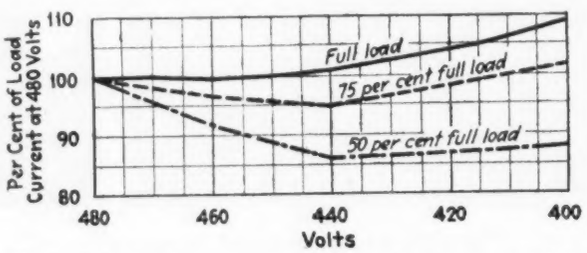
STANDARD induction motors and general-purpose synchronous motors are designed with balanced characteristics as to power factor, efficiency and operating torque. These characteristics are so balanced as to approximate ideal conditions when the motor is operating at rated terminal voltage and rated load. This balance will naturally shift with every change of load and with every value of impressed voltage, and it is the purpose of this article to indicate the importance of these changes to the cost of operation.

In order to meet the variations in voltage that occur in operating practice motors are designed to handle successfully their rated load at 10 per cent either above or below rated voltage. The knowledge that motors are designed to operate over this voltage range has led many operators to believe that the question of impressed voltage is relatively unimportant provided it remains within the 10 per cent plus or minus range. There is a further tendency, especially among operators of smaller plants, to see actual advantage in high voltage even when it exceeds the upper limit of guarantee.

Two factors have come about in recent years that are beginning to change current opinion and give to the subject of voltage regulation the importance it deserves. The first factor is the increasing size and importance of industrial plants that generate some, or all, of their own power, where the characteristics of the motor load are reflected in the generating plant. The second factor resulted from the rapid introduction of power-factor clauses in the rate structures of many public utilities. Both factors now bring home the fact that impressed voltage on industrial motors has a financial phase at least as important as the engineering factors involved.

To find the facts and evaluate them, one large industrial plant undertook a survey of 516 induction motors aggregating 10,200 hp., with sizes varying from 5 to 200 hp. and with speed ranges of 600 to 1,800 r.p.m. This industry operates its own turbo-generator plant and the study was instituted primarily to determine the ideal bus-bar voltage at which the generators should operate to produce minimum kva. output to the load. The induction motors in this plant were of both old and new types with about 1,000 hp. in synchronous motors connected to the same bus.

The result of the survey was a decision to lower the bus voltage from 480 to 460 volts. This decision was necessarily the result of compromise between the various factors involved, such as size, location and percentage of load of various motor groups in relation to the generating plant. The voltage might have been further lowered to advantage except for the limitation imposed by a group of distant motors whose torque would have been excessively reduced. Curves were developed covering both efficiency and power factor of motors at ½ to ¾ and full load and at various voltages from 10 per cent above to 10 per cent below rating. From this data another set of curves were plotted as shown in the accompanying chart,* which indicates change in load current with reduction in voltage.



Change in load current of induction motors with reduction in voltage

The curves cannot be taken too literally as they

**Chart prepared by H. A. Deliis of the engineering staff of the California-Hawaiian Sugar Refining Corporation, Crockett, Calif.*

vary considerably with size, type and speed of the motor group under consideration. They indicate fairly well, however, the important trends in motor characteristics with changes in load and voltage and point unmistakably to the fact that rated terminal voltage is ideal for any induction motor regardless of load. They further indicate that impressed voltages not exceeding 10 per cent above rating are not detrimental to a fully loaded motor and are undoubtedly favorable to an overloaded motor. On the other hand, impressed voltages not exceeding 10 per cent below rating are not adverse to underloaded motors, but are definitely detrimental to motors that are fully loaded. The value of the survey was proved by securing an actual reduction in kva. output from the generators.

Purchased power contracts

Extensive application of power-factor clause in rate structures is causing industrial companies to give close study to plant power factor. Very few of them, however, seem aware of the importance of proper voltage at the motor terminals.

The writer recently conducted an investigation of a large cement plant where the operating power factor was 96 per cent due to the presence of a number of large synchronous motors. The average voltage delivered to the 2,200-volt motor terminals was 2,400, and by having the utility company change transformer taps the operating power factor was raised from 96 per cent to 98 per cent with an increase of $600 per year in power-factor bonus.

Synchronous motor voltage equally important

Delivery of rated voltage to a synchronous motor is just as important, from the point of view of good power factor, as in the case of an induction motor. Armature input at any given load is a function of field excitation and of applied voltage. If a high operating voltage is reduced to rated terminal voltage, it is then permissible to increase excitation correspondingly with the production of more reactive current for a given shaft output. One large refrigerating company by lowering the voltage on an ammonia compressor increased the power factor by 6 per cent with a corresponding increase in power-factor bonus.

The proper voltage for an industrial supply is always necessarily the result of compromise and depends upon an accurate survey of all factors involved. There is no field of investigation, however, more fruitful in financial benefit because as a rule the moderate amount of money spent for engineering will yield direct returns without the expenditure of any capital investment.

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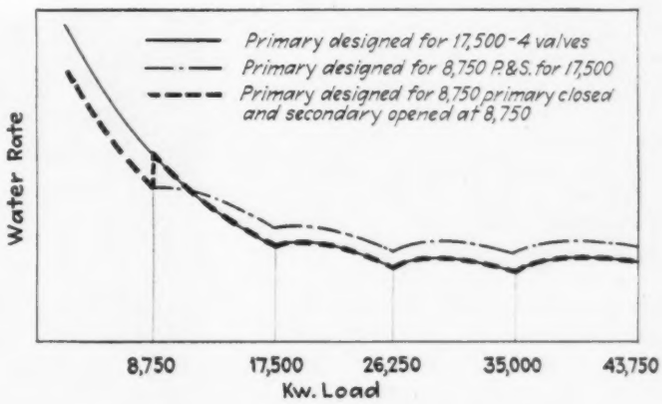
Multiple Nozzle Control Improves Turbine Efficiency

By J. D. SCHMIDT
Westinghouse Electric & Manufacturing Company

The demands of the central-station industry for improved efficiencies at fractional loads have led turbine manufacturers to the adoption of a greater multiplication of nozzle groups, and today turbines with five or more valves are not uncommon, whereas but a relatively short time ago three and even two valves were the accepted thing.

Heretofore it has been common practice, whatever the number of valves, to arrange them to be opened successively; first the primary alone, then the primary and secondary, then the primary, secondary and tertiary, and so forth. However, where, as in the greater proportion of modern turbines, the first stage is a velocity-compounded impulse stage, the velocity ratio of the primary nozzles, correctly designed for full primary steam flow, is not correct for the condition corresponding to full primary and secondary flow because of the greater back pressure in the impulse wheel chamber, caused by the increased flow, and the efficiency of the primary group is consequently reduced. On the other hand, if, with full primary open, the secondary starts to open, the secondary inlet pressure immediately drops to a relatively low value, and as it is increased with subsequent opening, the impulse chamber back pressure is increased also, so that the pressure ratio remains nearly uniform and consequently the secondary nozzle ratio will be nearly correct for all conditions of opening



Comparative water rate curves for 35,000-kw. turbine

of the secondary valve. The primary nozzle ratio diverges more and more from the designed value as the steam flow is increased.

Thus, obviously, it would be advantageous to close the primary after the secondary starts to open and to make the secondary nozzle area sufficient to carry the whole load up to the load corresponding to full secondary opening. This condition has been achieved in the case of a 40,000-kw. turbine in the Zilwaukee plant of the Consumers Power Company by means of a special device arranged to act upon the regular steam chest valve-operating mechanism. This device closes the primary valve shortly after the secondary starts to open and, on decreasing load, opens the primary before the secondary closes.

This turbine has a normal maximum capacity of 35,000 kw., with an overload valve permitting it to carry the full kva. rating of the generator, namely,

43,750 kw. at 100 per cent power factor. The unit is provided with five valves and the control mechanism is of the type in which variations in the oil pressure created by an impeller mounted on the turbine shaft actuate a relay admitting high-pressure oil to an operating cylinder, the piston of which rotates a camshaft connected to the several valve-operating mechanisms. Each valve has its own relay and operating cylinder, the movement of the relay being controlled by a cam on the common camshaft.

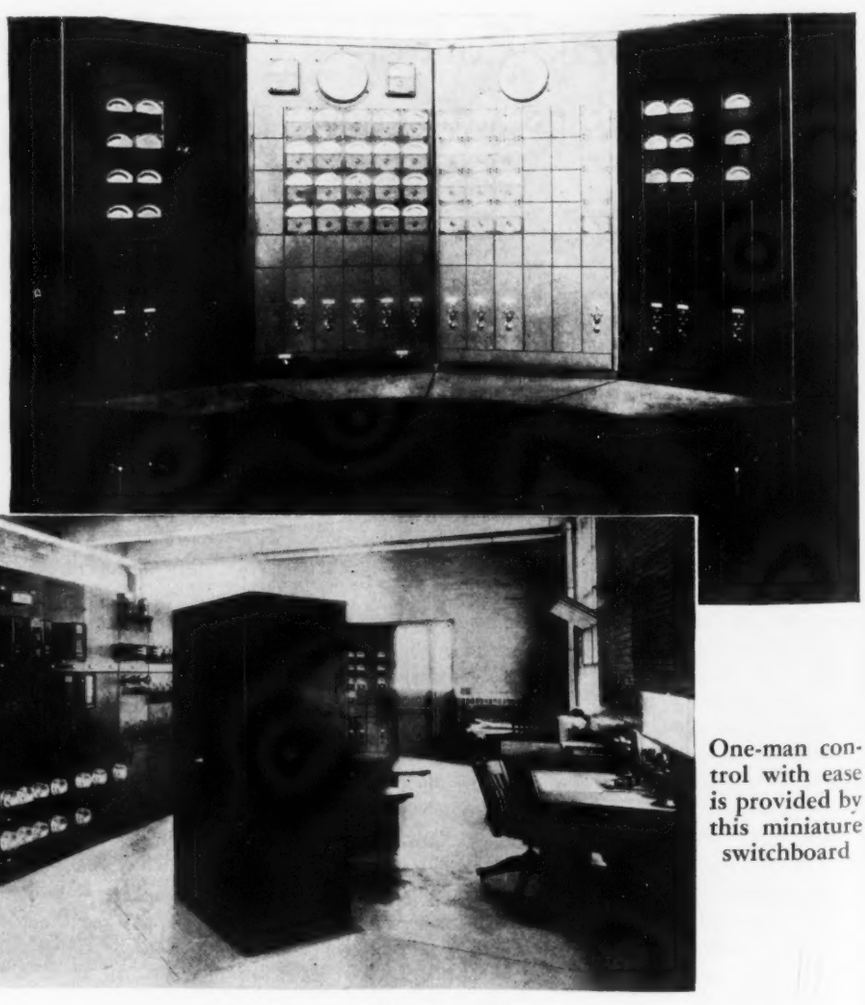
The reciprocal opening and closing of the primary and secondary valves is accomplished by means of a relay, deriving its motion from the rotation of the camshaft, and which controls the admission of oil to, or its release from, auxiliary operating cylinders mounted over the primary and secondary valve mechanisms. The pistons of these auxiliary cylinders, alternatively forced down against the resistance of coil springs, move the primary or the secondary relay, as the case may be, into the closed position irrespective of the position of the normal cam. The primary valve takes load up to 8,750 kw. At this point the secondary valve comes into effect and the primary is closed. The secondary takes care of loads up to 17,500 kw. when the tertiary valve opens and the two together carry up to 26,250 kw. The opening of the quaternary provides for the remaining range up to 35,000 kw., the normal full load, and the quinary serves as an overload valve.

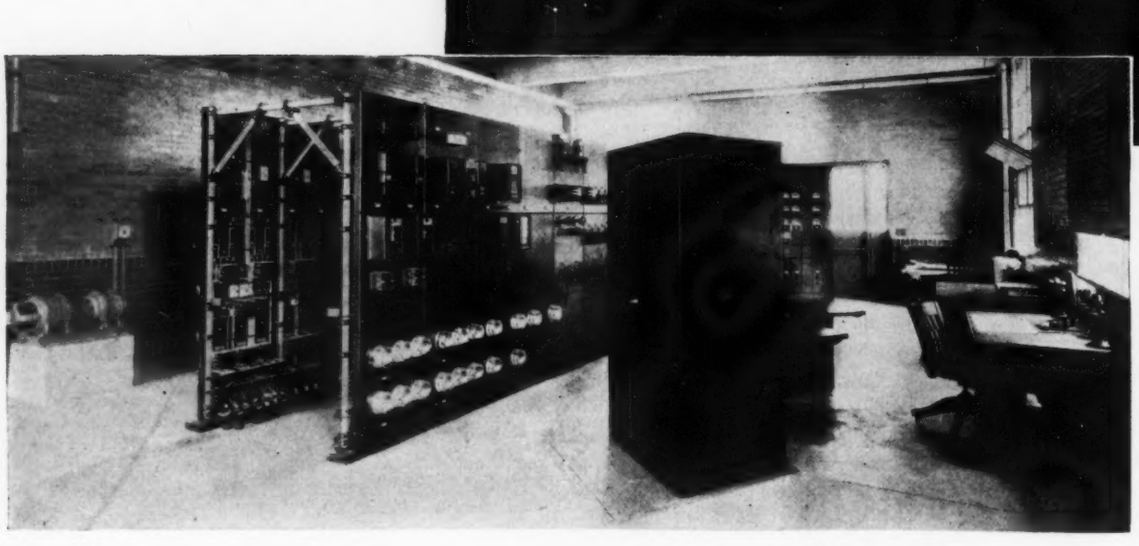
In this instance it is not so much the actual mechanism that is of interest as the fact that the feasibility of automatic substitution of one valve for another has been demonstrated. The extent to which such devices will be employed in the future is a question of economies; of balancing the possibilities for improved light-load efficiency against the unavoidable increase in first cost in providing the necessary mechanism.

Miniature Switchboard Simplifies Operations

Installed directly in front of a window from which a full view of the switch yard may be had and supplied with plentiful daylight and artificial illumination, this miniature switchboard centralizes operations and instrument indications at the 132-kv. Zanesville substation designed by the American Gas & Electric Company for the Ohio Power Company. Notable savings in floor space and operating effort are obtainable with the use of such miniature switchboards. For example, control and indication for 66 circuits may be located on a polygonal board, while with the inclusion of a straight section the capacity readily within the reach of one man may easily be increased to 80 circuits. This is particularly advantageous during emergency switching.

The panels behind the miniature board support necessary relays, manual switches and recording instruments. The miniature board used in Zanesville differs distinctly from similar ones of the supervisory or secondary type since the control and indicating circuits come directly to the devices on the board without any interposed relaying or other link circuits.





One-man control with ease is provided by this miniature switchboard

Advertising vs. Publicity

By DEMPSTER MAC MURPHY
Vice-President Middle West Utilities Company, Chicago, Ill.

Faced with the urgent necessity of getting their story across to the public, the electric utilities, except in a few conspicuous instances, are poorly prepared indeed for the job they must undertake. In this article Mr. MacMurphy points out a rock on which many utility informational programs have been wrecked

BY MANY electric utility executives the words "advertising" and "publicity" are taken to be synonymous and interchangeable. Yet in newspaper offices there survives a tradition that they are not merely antithetical, but mutually hostile.

To the extent that editorial men value the publicity releases of an institution or corporation as news, they are inclined to regard them as the very opposite of advertising. While this view is hardly consistent with the facts of our day, the tradition arose out of very real conditions. In the earlier and more impoverished stages of the evolution of the modern newspaper advertisers all too frequently attempted to influence or suppress news. And the advertising departments of newspapers, eager for business at any cost, were all too apt to aid in such pressure, so that in time editorial employees came to regard the advertising department and its people as their natural enemies, even though the latter provided a large part of the income which maintained the paper. Public utility executives should ever keep this tradition in mind, and the utmost care should be exercised never to offer as publicity matter that which should be paid for at advertising rates.

The real question as to advertising and publicity, then, is "when and where is a given fact or topic of discussion advertising or publicity?"

No hard and fast rule can be evolved which will always make a proper distinction. To revert to Omar: "A hair perhaps divides the false and true," and occasions arise when it is extremely doubtful whether a matter of both public and private interest is a proper subject for the one, advertising, or for the other, publicity. Such occasions are rare, however. In most instances the publicity man can make a decision instantly. He usually does this by a process which seems almost instinctive, exactly as the newspaper man's "nose for news" seems to be as instinctive as a bird dog's nose for quail. However, in both cases this power of selection traces back to a mind saturated by the traditions of the craft, to which personal experience, in rich measure, has been added. This apparently mysterious power of selection arises from a keen sense of balance. What is news and what is advertising at any moment is largely determined by the balance of interest between the institution which gives out the news and the institution which receives it.

If a utility corporation ardently desires the publication of a fact or the discussion of a topic in which the newspaper is but languidly interested, the presumption is very strong that advertising rather than publicity releases should be employed. On the other hand, if the actual or potential demand of the newspapers for such information is keener than the desire of the utility corporation to give it out, it is unquestionably news.

It is usually, but not always, true that the desire of the utility company to secure publication of facts or discussions is closely related to its desire, first, to sell more power or appliances; second, to acquire the good will of the community, and, third, to sustain the market for its securities. The more immediate and the closer the selling motive is to the desire for publication, the stronger is the presumption that the information should be imparted in paid advertising, with or without accompanying news releases.

On the other hand, it is frequently the case that a strong sales motive may coincide with the publication of facts which have the highest news value because they directly affect the pocketbooks of the readers of newspapers. Rate reductions are spot news to the *n*th degree. Every newspaper wants to print the news about them and would resent delay in giving out the facts. At the same time, news of a rate reduction is of high good-will value to a utility and it is frequently good policy to supplement the news by advertising which will heighten the effect of the announcement and will also make clear details or underlying reasons which the company desires the public to have, but which may not possess first-class news value.

News value is not stable

News is not exactly a staple commodity. Facts which have much news value at one time may have less at another. This depends largely upon the state of the public mind. At times when public attention has been drawn sharply to questions relating to utilities, many facts which would otherwise possess slight news value are eagerly desired by editors. Such facts may range all the way from the quality of coal used by a utility company to the personal appearance of its executive. At such times news stories wholly or almost entirely devoid of new facts, events or spot news elements of the usual kind, and consisting of statements, interviews and discussions by utility executives, engineers or lawyers, may become first page news. In such times it is usually the case that such news will be advantageously supplemented by aggressive advertising copy setting forth the views of the industry or the corporation.

News value at any time is largely determined by a process of competition for public interest. Newspapers are not planned in advance like the commodities of a manufacturing corporation or the services of a utility company. From all parts of the world there pours into the editorial rooms a stream of facts, opinions, comment, gossip, feature stories, pictures and what-not which are subjected to a continuous process of selection and rejection as fast as they come in. The display and space accorded them by the newspapers vary not only from day to day but from edition to edition of the newspapers, many of which print seven or eight editions a day. Consequently, the treatment accorded in the newspapers to publicity given out by utility companies varies from hour to hour as well as from day to day, because the relative value of the news contained in such publicity is affected by the value of every other piece of news submitted to the newspaper. One of the most important qualifications of a competent publicity department is that it have the experience and facility to measure the probable flow of competitive news and adjust its own news releases to such conditions.

Many stories given out by utility companies, of course, cannot be withheld, but must be made public as soon as the events occur. In such cases the publicity obtained must be trusted to the chances of news competition in the editorial rooms. But where the release of stories can be timed without breaking faith with the newspapers, the publicity should be given out when it will meet the minimum of competition for the public interest. To a lesser degree this applies to advertising. When the public is reasonably satisfied about rates, it is obviously unnecessary and unwise to print advertisements justifying a rate schedule. At such times it is much better to spend advertising appropriations to assure a wider distribution of the utility's securities or to promote the sale of current and appliances.

While some kinds of advertising are never news and cannot be made news, it is a fact that intelligent advertising, planned with an eye to the future, can create new popular interests which in time make topics similar to those dealt with in the advertising matter of news interest.

All advertising, to the extent that it heightens popular interest in the utility industry, has the effect of giving added news value to any news facts given out by the publicity department of a utility corporation. The best illustration is that the advertising and sales efforts which have so greatly enlarged the number of holders of utility securities have automatically implanted among the financial editors in the newspaper a desire to present promptly and completely all facts having to do with the earnings of utility companies and their general growth and prosperity.

Newspapers strive not only to inform and entertain their readers but to protect their interests, and in any community where there are a large number of utility stockholders a newspaper editor as a matter of course wishes to keep his readers fully informed as to the financial condition of the corporations in which their money has been invested. This is an example of building news interest by advertising and sales, which benefits everybody concerned—the utility companies, the newspapers, and the newspaper readers. By building up such an interest, the newspapers come to demand news and the publicity departments, in satisfying that demand by giving out the facts, are not seeking publicity for their companies, but are satisfying the natural quest of the newspapers for news. That, of course, is the most desirable relation which can exist between publicity departments and the editorial departments of newspapers, and with respect to the greater portion of the news given out by publicity departments today that relation prevails.

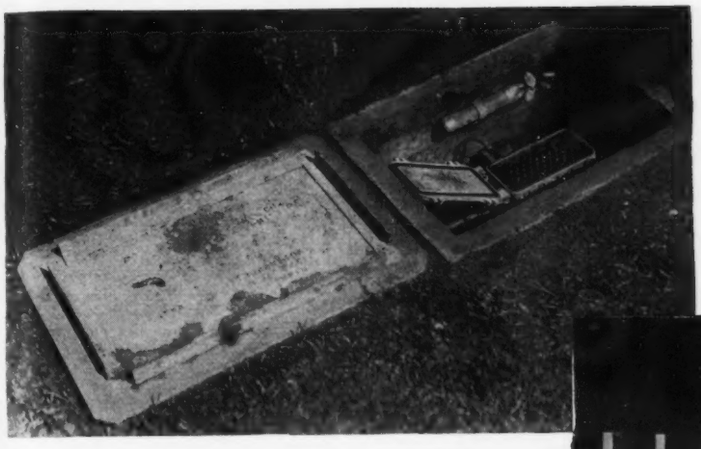
So widespread has become the interest of the American people in the utilities and so numerous are the owners of utility stocks, to say nothing of the fact that frequently 100 per cent of newspaper readers are also consumers of electric light and power, that the day has long passed when the release of news by the companies to the newspapers implies the seeking of a favor in its publication. The publicity department, of course, seeks to maintain cordial relations with the editorial employees of newspapers with which it transacts business, but these are purely personal, and a large part of the news published would be published even if it were passed between men not on good terms. The public utilities, in fact, could not afford to withhold such news and the newspapers could not afford not to print it.

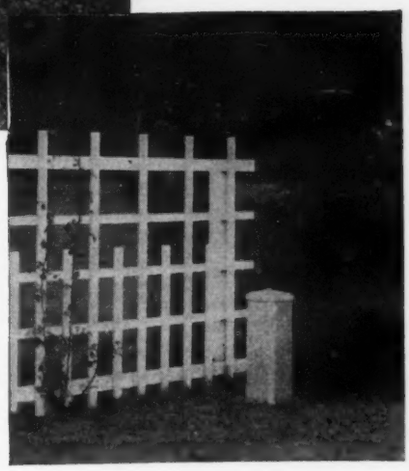
This does not imply that the publicity function is automatic and that it can be carried on by morons. The publicity department should possess a nose for news as good as that of the newspaper man. Otherwise it will never know when the company has any but routine news to offer. It must also have a technical knowledge of news gathering and the publishing of newspapers so that it will offer its news in the form in which and at the time when the newspapers prefer it. Spot news is the backbone of newspaper content, but in many newspapers today it constitutes less than half of the editorial matter printed. In addition to editorials and standing features, newspapers print all kinds of stories having what is called a "feature" angle—that is, some element of the unusual or dramatic.

Because the modern utilities play such a part in the life of the people and are such important factors in the breath-taking changes of industry, trade and every-day life, they come more and more to be sources of economic and social news. We are becoming a socially minded people and millions today are interested in questions which formerly occupied the attention only of cloistered economists and sociologists. People realize that the kind of lives they lead today have been largely shaped by the great scientists, inventors and engineers, financiers and industrial organizers of the past century, and they know that the lives of their children will be different from theirs—they hope much better—because of similar efforts now being put forth by the same social groups. They are therefore interested in the manner in which the development of the utilities will affect our national life.

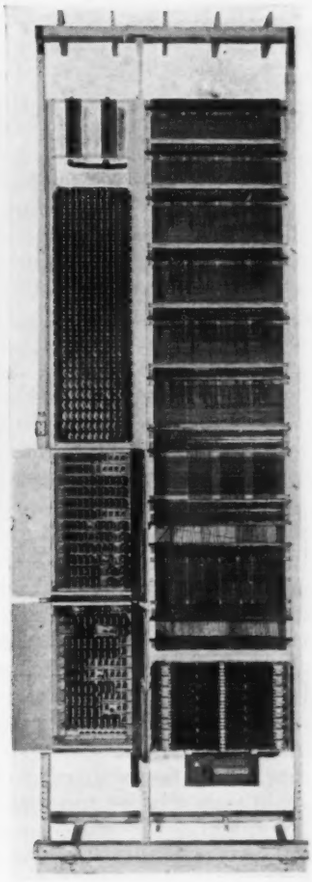
This growing interest of the public can be met by the utilities, both by intelligent advertising and intelligent co-operation with the newspapers in providing news relating to it. Advertising should carry the base load in the work of meeting legitimate public expectations of enlightenment on such matters. If the advertising is done intelligently, the news will follow as a matter of course and without solicitation.

Some Telephone Equipment Developments During 1931

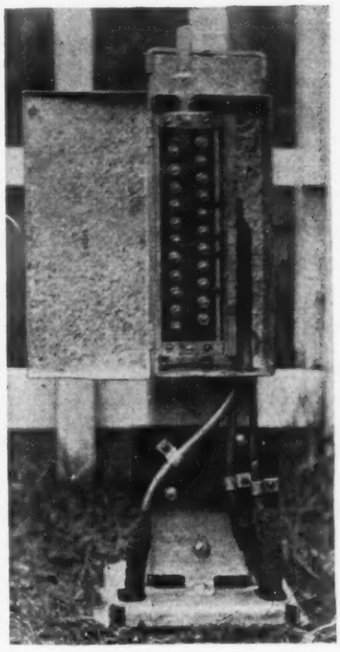




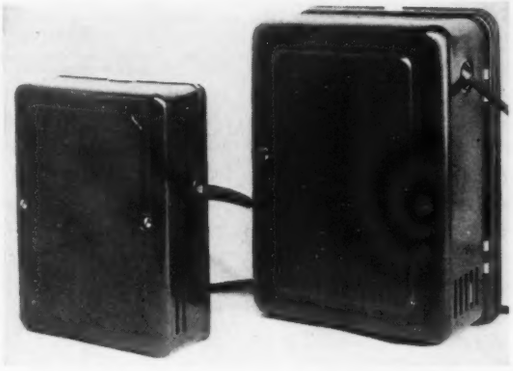
Inconspicuous cable terminals—underground and overhead



Decoder expedites handling connections between dial and manual sets

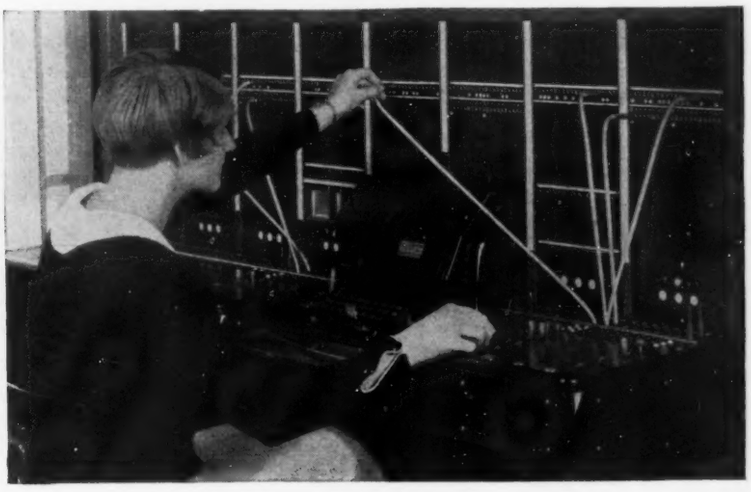


Cordless exchange for seven stations and three trunks



Size of subscriber's ringer set reduced 60 per cent

Teletypewriter service now as flexible as telephone calls



Electric Brass Furnace Saves Its Cost in Two Years

ECONOMY of electric heat in brass melting is evidenced in a recent analysis of comparative production costs by the Rockwood Sprinkler Company, Worcester, Mass., for coke-fired and electrical equipment. About the same quantity of metal was involved in the foundry in each case. Cost records for fuel-fired and electrical equipment were kept for more than three years at the plant. The records of the coke-burning furnaces cover the combined output of nine units, each averaging a daily production of 120 lb. and resulting in a total annual output of 162 tons. The average yearly output of the electric furnace is 158.4 tons of melted brass.

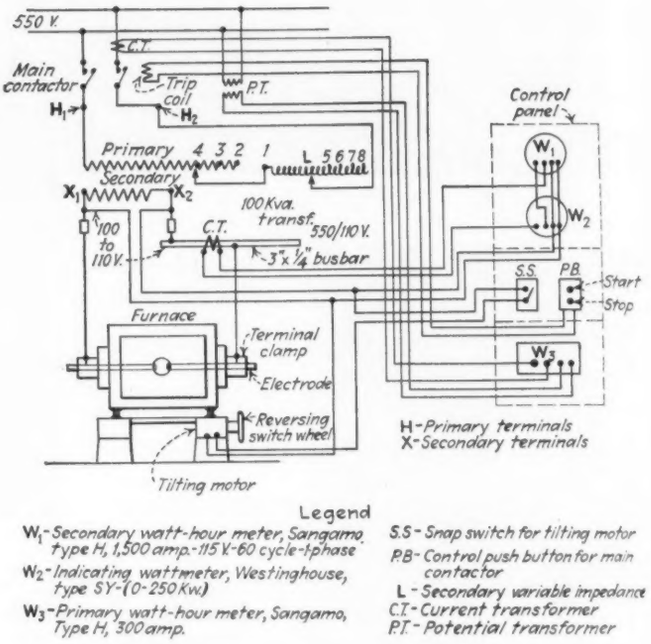
An electric furnace of the direct-arc rotary type, made by the Detroit Electric Furnace Company, designed for a normal capacity of 250 lb. per heat, operating at 90 to 103 terminal volts alternating current, single phase, 60 cycles, is used. Energy is supplied through a 100-kva. regulating transformer with primary terminals connected across one phase of a 575-volt, three-phase supply circuit.

The graphite electrodes are slightly more than 3 in. in diameter and weigh 15 lb. each when new, including metal screw ends. Electrodes are inserted through the brick-lined ports and are held in place by water-jacketed terminal clamps to which flexible cables are connected from transformer secondary terminals. Waste of electrode ends is eliminated by connecting the threaded sleeve of the new electrode to the screw end of the old one, care being taken to keep the splice inside the ports to avoid arcs between terminals and splices.

As shown in the connection diagram, transformer primary taps and variable impedance winding used for voltage regulation have been so adapted that by changing the connection of the impedance terminal (point 1) to either of the primary taps 2, 3 or 4 it is possible to change the transformer ratio from 5 to 10 per cent of normal, which is 5.58 at no load. Finer regulation of secondary voltage may be obtained by varying the connection between the transformer primary terminal H_2 and the impedance winding taps 5, 6, 7 and 8. This provides a means for varying the voltage across the furnace terminals between 90 and about 103 to suit the requirements of different heats. Close regulation of secondary transformer voltage is obtained at the sacrifice of considerable drop between primary and secondary terminals, accompanied with low power factor, with a corresponding power loss through the transformer. A test run with a primary input of 135.6 kva. at 565 average volts and 240 amp. shows a power input to the furnace of 94 kw., indicating a power factor of 0.69. The primary input to the transformer at this loading was 103.3 kw., showing a power loss through the transformer of 9.9 per cent.

As indicated on the diagram, power is switched on the primary side through a magnetic contactor equipped for remote control and with an overload relay. Losses between primary transformer and furnace terminals are checked every 24 hours by reading the corresponding watt-hour meters on the control panel, on which are also located a secondary circuit indicating-type wattmeter for checking the load on the furnace, a remote-control double-button switch for the primary contactor and a snap switch for the control of the furnace rotating and tilting motor. This circuit is also equipped with a handwheel and a set of levers to regulate the direction and limit of travel of the furnace frame.

The operating cycle of a typical heat with the electric furnace is given in Table I, based on an average daily operation with thirteen heats, each producing about 250 lb. of melted brass. This indicates an average power consumption of 325.4 kw.-hr. per ton, including the energy used in preheating the furnace after idling 24



Impedance regulation gives close voltage control for different heats

Table I—Typical Operating Cycle of Average Heat in Electric Furnace

Typical Charge	Lb.		Lb.
Copper	88	Chips	40
Tin	10	Scrap	115
Zinc	2	Total	255

Average production with thirteen heats per day	
Pounds melted in one heat	250
Kilowatt-hours consumed per heat	40.7
Time arc is on, minutes	32.4
Charging time, minutes	12.6
Lbs. melted per kilowatt-hour	6.14
Power consumption, kilowatt-hours, per ton	325.4

Table II—Average Production Costs per Ton with Coke-Fired and Electric Furnaces

(a) **Coke-fired furnace** (based on annual output of 160 tons)	
Fuel at average cost of $0.01 per pound of metal	$20.00
Lining and patching	0.66
Labor, at $0.60 per man-hour	9.26
Interest on total investment for nine furnaces and chimney, amounting to $1,600	0.60
Depreciation and maintenance	1.00
Total	$31.52
(b) **Electric furnace** (based on annual output of 158.4 tons)	
Power at average consumption of 325.4 kw.-hr. per ton, at an average rate of $0.02 per kw.-hr.	$6.51
Lining and patching	0.34
Electrodes, consumed at rate of 7.14 lb. per ton, at $0.21 per lb.	1.50
Labor, including pouring into crucibles, but not into molds, at $0.60 per man-hour	3.60
Maintenance of terminal clamps	0.20
Maintenance of electrical equipment	0.44
Melting loss, 1.1 per cent of charge at $0.11 per lb.	2.42
Cost of crucibles (No. 40, capacity — 120 lb)	0.52
Cost of preheating crucibles (fuel oil)	0.86
Interest on investment of $3,700, covering cost of furnace, transformer and auxiliary equipment, installed	1.40
Depreciation	2.33
Total	$20.12
Saving per ton in favor of electric heat	11.40
Saving, based on cost of coke furnace brass melting, per cent	36.2

hours or longer. The preheating period takes about eighteen to twenty minutes, power being turned on and off intermittently, with an average energy consumption of 20 kw.-hr. to raise the temperature of the furnace to the point of operation.

Comparative costs per ton of melted brass with coke-fired and electric furnaces are given in Table II. This indicates a saving in favor of electric heat of $11.40 per ton, which represents a cut in cost of 36.2 per cent, based on production cost with fuel-heated units of $31.52. Assuming the coke furnaces to be scrapped, with the total investment of $3,700 for the electric furnace, transformer and auxiliary equipment, the annual saving with the electric heat is $1,824, based on a normal yearly output of 160 tons. At this rate the electrical equipment is paid for in a little over two years.

Referring to Table II, the cost items for electric heat include amounts spent for furnace and crucible preheating. This latter item is based on preheating the crucibles with fuel oil. With increased production which would justify preheating crucibles by electricity this may bring greater economy due to saving in time and labor with the electric method. The cost of cooling water for electrode terminals has not been included, as with a large number of furnaces in operation the water is recirculated through the jackets, which calls for a negligible amount of make-up cooling water.

In addition to economy of production, the electrical method of melting has the advantages of close temperature control and elimination of gas and foreign particles from the melt, with the consequent improved quality of product.

Test Frequency or Polarity with Neon Lamp

By F. H. ROGERS

Assistant to Superintendent Meter and Installation Department, Consolidated Gas, Electric Light & Power Company

With the development in Baltimore of an a.c. network in the old d.c. district there are instances where both a.c. and d.c. circuits are in the same building. It has become necessary to furnish installers and troublemen with some means of testing to distinguish between these circuits. Also, in certain manufacturing districts, where there may be both 25- and 60-cycle circuits on the same pole line, some device for testing circuits is needed.

A very simple and inexpensive device has been adopted that not only indicates whether a circuit is 25-cycle, 60-cycle or direct current, but, if the latter, shows the polarity. It consists of a 2.5-watt neon glow lamp screwed into a test lamp socket, into one leg of which has been soldered an ordinary 25,000-ohm, 2-watt, metallized resistor, such as is familiar to any radio fan. The purpose of the resistor is to limit the voltage across the lamp terminals, thus making it possible to use the device on circuits up to 500 volts. The lamp itself is rated at 115 volts. When connected across a direct-current circuit only one lobe of the lamp glows. If the leads are reversed, the opposite lobe glows. By marking the lead which is in contact with the positive side of the circuit and marking the glass on the side where the lobe is glowing, the device is "calibrated" for showing d.c. polarity. Black and white leads are used, black being positive. A decalcomania company identification stamp is used on the glass bulb of the glow lamp.

When used across an a.c. circuit the two lobes glow alternately, as the polarity changes, the resulting flicker indicating whether the circuit is 25 or 60 cycles. It is very easy to distinguish between the flickers for these two frequencies.

In using the device to determine the nature of a circuit, it is placed across the circuit in the same manner as an ordinary test lamp. If only one lobe glows the circuit is d.c. The lamp must be connected so that the lobe on the side next to the decalcomania stamp glows; then the black lead is connected to the positive wire. If, however, both lobes glow the circuit is a.c., and the rapidity of the flicker indicates whether the frequency is 25 or 60 cycles.

Benefits of Electric Cooking in Long Island Cafeteria

By WIRT S. SCOTT
Special Representative
Westinghouse Electric & Manufacturing Company

Serves 10,000 meals a month, at noon only, five days a week.
Has 159 kw. in heating equipment and nearly 6 hp. in small motors.
1.19 kw.-hr. used per meal served.
Some indirect benefits cited by chef.

THE New York & Queens Electric Light & Power Company has one of the most modern electrified cafeterias in the country in its Queens Borough, Long Island, office building. Meals are served at noonday only, five days a week, an average of 10,000 being served per month, the daily number varying between 475 and 600.

The power and heating equipment installed in the kitchen for the preparation of the meals is listed in an accompanying table.

The range hot plates are turned on at 6:50 a.m. and the oven at 7 a.m. Cooking on the range tops is usually finished at 11:15 a.m., at which time all but two are turned off, the reserve heat in the heavy cast steel tops being sufficient to keep the foods hot until ready for serving at noon. Two of the hot plates are kept on "low heat" until 2 p.m. to keep the food hot for the executive dining room. The range oven is turned off at 10 a.m. and the roasting continued on receding heat until 11 or 11:30 a.m.

Two 50-lb. roasts are placed in each section of the meat-roasting oven at one time, with oven on "high heat." In one hour the heaters are turned on "medium" and finally turned off entirely, with the roasting continuing for 30 minutes on the stored heat of the oven.

The chef reports that, in comparison with fuel-fired ovens, he does not have to open the door nearly so often and that the meats do not shrink or lose weight so much, that the bottoms of the roasts are never charred, causing a loss of meat. Furthermore, he states that the oven roasts or bakes uniformly in all parts, day after day, and that the positive control afforded by the control switches removes all guesswork and relieves him of having to pay the attention to the adjustment of burners and turning the roasts around in the oven that otherwise is required in an attempt to obtain best results with fuel equipment.

The bake ovens are used for baking pies, cakes, pastries and rolls. Forty 12-in. pies and from 22 to 25 dozen rolls are baked each day. In addition, a varying amount of pastries and cakes are baked. The baker was highly pleased with the electric ovens, stating that they were the first ones he had ever operated that would bake pies on the bottom thoroughly, as they should be baked.

The chef reported that the electric range had a greater speed in cooking than either a gas or coal range. He explained that a gas range would heat up faster, but that after the electric range became hot it was actually faster than the gas.

The absence of fumes and the reduction of heat was commented upon as being one of the main features tending toward making the work of the cook and baker less fatiguing. The constant and positive control greatly reduced the amount of time necessary for them to be directly over the range or in front of the bake oven, lessening the amount of labor required to quite an extent. The cooking, roasting and baking were now a matter of definite timing operations. Practically all guesswork has been eliminated.

The indications were that for a given production capacity less space would be required with electrical

Table I—Electric Equipment Used in Cafeteria

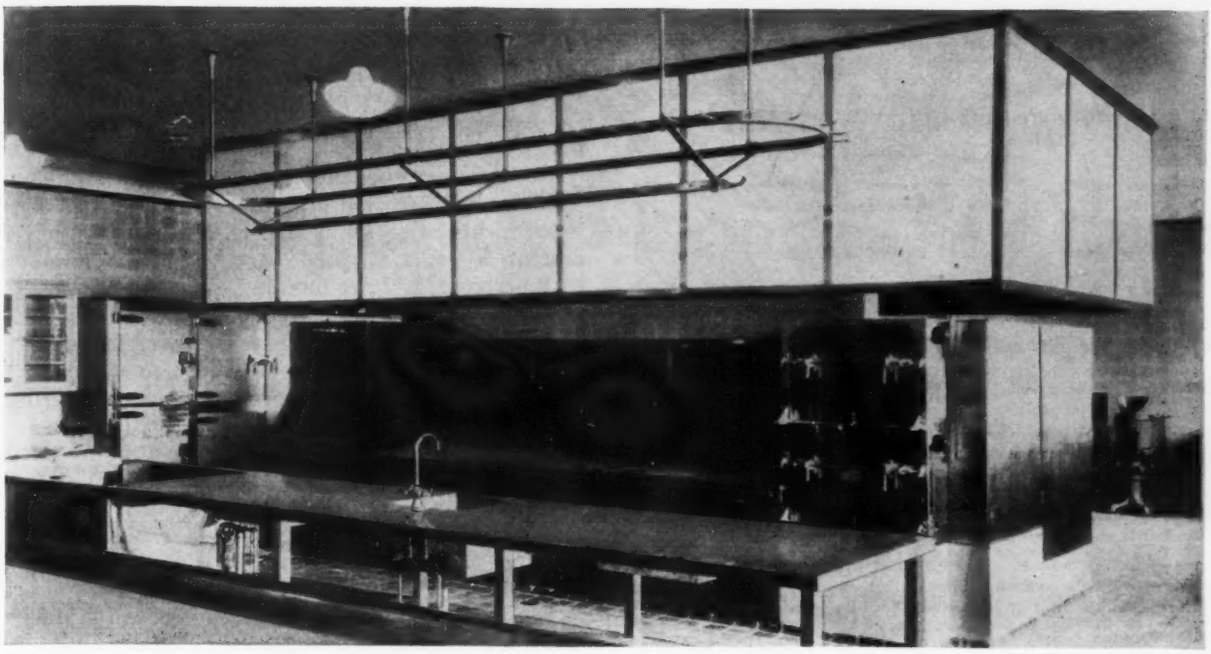
Heating Equipment:

		Kw.
1	Hotel type range, provided with four hot plates and one roasting oven	24
2	Hotel type cooking tops, duplicates of the hotel range without the oven	36
1	Broiler, with a broiler grid area 33 in. wide x 24 in. deep	12
2	Meat roasting ovens, sectional type, each section 28½ in. wide x 38 in. deep x 12 in. high, and equipped with automatic temperature control	9
1	Bake oven, three sections, each having a hearth area 28½ in. wide x 38 in. deep x 7½ in. high	13½
2	Steam tables, equipped with plate warming compartments	12
2	Coffee urns, each having a capacity of 10 gal. coffee and 20 gal. hot water	18
1	Stock kettle, 25 gal. capacity, electrical capacity	9
1	Bain Marie	6.5
1	Double urn stand and cup warmer 60 in. wide x 28 in. deep, electrical capacity	1.5
1	Hot water heater for dishwasher	10
1	Toaster	4.1
1	Hot plate	3.6

Total capacity of heating equipment — 159.2 kilowatts

Power Equipment:

	Hp.		Hp.
1 Dough mixer	½	1 Ice cream refrigerator	¼
1 Meat grinder	¾	1 Service refrigerator	½
1 Vegetable parer	½	1 Storage refrigerator	1
1 Coffee grinder	¼		
1 Dishwasher	1½	**Total power equipment**	5⅞



One of the finest electric kitchens in this country

Electric ranges, an electric broiler and an electric meat roasting oven are shown in the center. The bake shop is directly in back of this equipment.

equipment than with any kind of fuel equipment. Each range top was capable of turning out 250 meals, which speaks for itself. The present equipment will be adequate for the production of 750 noonday meals. It was the opinion that 50 per cent additional space would be required if fuel equipment were used, to turn out the same number of meals the electrical equipment was capable of producing. This, in itself, is proof as to the comparative speeds of electric and fuel ranges.

The cooking vessels do not collect any dirt on the outside except such as might be spilled on the outside from the inside. This makes them much easier to clean, since the greatest amount of labor in cleaning pans and pots used on fuel ranges is the removal of the carbon deposit on the outside. It was estimated that the labor for such cleaning was approximately one-half of that required if fuel ranges were used. Ranges are also much easier to keep clean, and therefore labor was saved in this respect. It was stated that practically no amount of scourng and cleaning on some fuel ranges would permit them to be kept as clean as the electric ranges.

Cooking and baking costs

The entire kitchen equipment was on one meter, giving the total kilowatt-hours consumed for all the motor-driven machines and the commercial cooking equipment. An analysis was made from observation of the operation of the motor-driven machines to determine as accurately

The bake shop

Shows the same conditions as prevail in the kitchen; convenience of operation, cleanliness, and all electric equipment throughout. On the table are two round hot plates for pastry work.

as possible what the consumption would be per month for this load, so that it could be deducted from the total consumption.

Table II—Estimated Monthly Energy Consumption

	Kw.-Hr.		Kw.-Hr.
Dishwasher	105	Ice cream refrigerator	75
Small refrigerator	150	Miscellaneous machines	130
Large refrigerator	210		
		Total, per month	670

Deducting the power consumed by the motors, the average kilowatt-hours consumed per month and per meal served are as follows:

Total kilowatt hours (six months)	70,500
Deduction for motors (6x670)	4,020
Net kilowatt-hours for commercial cooking (six months)	66,480
*Kilowatt-hours consumed per meal served	1.25
Total kilowatt-hours (five months)	63,740
Deduction for motors (5x670)	3,350
Net kilowatt-hours consumed for commercial cooking (five months)	60,390
***Kilowatt-hours consumed per meal served**	1.19

*This average is somewhat high, due to the fact that the total energy consumption includes occasional evening dinners, attendance at which is not included under the item "Total Meals Served."

The amount of electric power or fuel, of any kind, consumed per meal is governed almost entirely by the kind of a meal being served. Simple or light meals, such as are served in hospitals, consume a minimum amount of power or fuel, while in a high-grade hotel or club the consumption will be a maximum, and may be from four to six times as much as a hospital for the same equipment.

The lunches served by the New York & Queens Electric Light & Power Company are of the highest grade and as complete as may be found in all but a few of the finest cafeterias throughout the country.

This being a new installation, there was no opportunity to make an accurate comparison of heating costs with other fuels. However, from data collected with respect to gas consumption for a large number of installations of various sorts, and assuming a value as near as could be determined as to the gas consumption for similar service, the consumption would be at least 12 cu.ft. of gas per meal served.

On the basis of electricity at 1.5 cents per kilowatt-hour and gas at $1 per thousand cubic feet the operating costs in each case, for 10,000 meals per month, would be:

Electric Costs (10,000 Meals)
10,000 x 1.19 = 11,900 kilowatt-hours
Electricity cost, at 1.5 cents = $178.00

Gas Costs (10,000 Meals)
10,000 x 12 = 120,000 cu.ft.
Gas cost 120 x $1.00 = $120.00

The complete survey of all factors entering into the operation of the electric cooking and baking equipment show many decided advantages of this type of equipment. This increased cost of approximately $58 per month, based upon $1 gas and 1.5 cent electricity, is only one factor entering into costs; therefore, an attempt was made to place approximate values on the added advantages of electricity in terms of dollars and in accordance with net value to the company for such tangible accomplishments as seem justifiable:

Reduction in labor for cleaning pans and pots, scouring the equipment, etc., estimated at $60 a month, including meals for such help.

Reduction in soaps and washing powders used, at a saving of approximately $10 a month.

Reduction in cleaning walls, woodwork, etc., at a saving of $5 a month.

Improvement in quality of meals, at a minimum estimated value of one-half cent a meal, $50.

Reduction in spoilage, at $5 a month, minimum.

Estimated saving in meats, due to less shrinkage, 3,000 lb. of meats of all kinds roasted per month, at an average cost of 30 cents a pound, based upon a minimum saving of 8 per cent, $72 per month.

For the general improvement in results obtained, such as duplication of product, ease of operation, minimum attention, improvement in working conditions, and the certainty of a high-grade product always being obtained, a value of $25 a month was found justifiable.

Totals of the above values give a figure of $227 a month as the gross value of electric heating over fuel, not including the difference in fuel costs. Deducting the difference in heating costs of $58 a month, the electric cooking and baking equipment shows a net saving of $169 a month, or $2,028 per year.

It is believed that the values placed on the various items enumerated are sufficiently conservative to show an economic advantage in the use of commercial cooking at rates from 1½ to 2 cents per kilowatt-hour in comparison to gas at $1 per thousand cubic feet, for general commercial restaurants, hotels, etc., where economy of operation, combined with a high-grade product, is essential.

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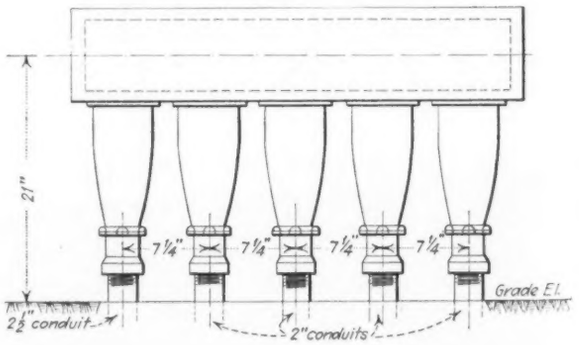
Sectionalizes Power Supply for Operating Breakers



Instead of running separate switch-operating circuits from one point or going to the opposite extreme and taking direct current for breaker operation from a single circuit wandering all over the yard the Management & Engineering Corporation took a rational middle course in designing the 132-kv. outdoor installation at the Harding Street station of the Indianapolis Power & Light Company. The twelve breakers in the substation were divided into three equal groups, each group supplied with operating current by a feeder. This feeder comes to the center of the area occupied by the group of four breakers and there divides into sub-circuits, one to each breaker. These sub-circuits are fused at their origin on a short bus contained in the fuse cabinet shown in the drawing.

Municipal Utilities Increase Florida Tax Burden

By W. AUSTIN SMITH
Consulting Engineer, Jacksonville, Fla.

After rebuilding two of the more successful municipal utilities in Florida the author remained to manage them. He is now municipal consultant in the utilities division of the Florida League of Municipalities. In this article he goes straight to the fallacy in the oft-repeated assertion that municipal utility profits virtually make the town tax-free

THE assertion that certain municipally owned and operated utilities have been so successful that they have made their respective cities tax-free has been made through various agencies recently. While the specific cities referred to were in the Middle Western section, in a cheap fuel oil area, the question has been raised as to just what part municipal ownership is playing in the tax situation in Florida.

During the years 1924-25-26 Florida went through a most exaggerated period of expansion and growth which took on the proportions of a statewide boom. This expansion was participated in by all sections of the state, but was most intense along the east coast from St. Augustine south, the central section from Gainesville south and the entire southern and central section of the west coast up to and including the Pinellas Peninsula. Cities doubled and trebled in size in two brief years and new cities sprang into existence. All spent vast sums of money for improvements to keep abreast with their rapid increase in population. Laws enacted in 1923 and in 1925 made bonding easy and almost unlimited.

In the latter part of 1926 the peak was reached and a rapid slump in activities came, with the usual attendant business and financial disturbances. The most lasting result is that nearly all cities in the area affected found themselves with improvements sufficient for cities much larger and with a load of bonded indebtedness much greater than is common to communities of similar size reached through normal growth. This condition makes for a difficult tax situation that must be worked out. Many organizations are spending every effort to devise or discover ways and means for meeting these tax demands. It is through the assistance of some of these organizations that the studies, some of the results of which are contained herein, were made possible. These studies deal with municipally owned and operated utilities in Florida and their effect upon taxes.

Florida has very few municipally owned and operated utilities in the electric field, but most Florida cities own their water systems. There are, however, fifteen towns in the state that own and operate electric utilities and there are four towns that buy energy wholesale from the power companies and distribute it over their own systems. Among the fifteen, the largest is Jacksonville and the next largest is Orlando, a city of about 35,000 people. Most of these properties are owned by cities ranging in size from 10,000 down to 3,000 people. For this study we have selected six towns of medium size, the largest with 14,000 people and the smallest with 3,000. Reference will be made later to Jacksonville, Florida's outstanding municipal ownership town.

Accounting records prove incomplete

These cities are hereafter designated as "A," "B" and "C" that operate steam-electric plants and "D," "E" and "F" that operate Diesel-electric plants. All own and operate their water works, which are driven by electric power from the city's electric plant. In order to get a true picture of these operations a thorough individual study of each town was made. Accountants made a study of the cities' books, reports and such records as were available and so arranged their report upon each town that comparative results were obtained. There is no uniform accounting system in use among Florida munici-

Table I—Assessed Valuation, Utility Bonding and Defaults for 1930

					—Electric and Water Departments—			
City	Population	Assessed Valuation	Total Bonded Debt	Utilities Bonds Outstanding	Total Reproduction Costs	Present Actual Value	Tax Rate, Mills	Bonds in Default
"A"	12,000	$8,183,243	$1,398,900	$364,000	$1,029,523.00	$702,896.00	16	None
"B"	6,600	9,836,212	1,413,000	333,260	656,049.00	443,364.00	12	(1)
"C"	6,000	8,943,085	3,481,000	546,500	1,072,791.00	766,388.00	28½	(2)
"D"	6,000	5,200,900	4,389,628	236,370	948,855.00	655,021.00	28	$1,255,470
"E"	3,500	6,274,780	3,109,000	500,000	655,911.00	457,011.00	25	$150,167
"F"	3,300	4,110,764	943,500	201,000	438,272.00	287,247.00	25	None
Jacksonville	130,000	101,504,460	15,408,000	3,152,500	.....	.....	21.8	.....

(1) Refunding issues of $22,000 and $64,000. (2) $1,555,000 refunded to prevent default.

Table II—Three Plants Show Profit, Three Show Loss

(1930 Earnings and Expenses of Florida Municipal Utilities)

Plant	Steam-Electric Plants "A"	"B"	"C"	Diesel-Electric Plants "D"	"E"	"F"
Gross earnings:						
Electric	$242,936.20	$116,481.41	$145,019.43	$127,512.34	$78,477.46	$65,473.11
Water	68,479.87	24,002.27	32,865.20	29,824.99	28,250.85	23,711.40
	$311,415.07	$140,483.68	$177,884,63	$157,337.33	$106,728.31	$89,184.51
Operating expenses:						
Electric	$94,838.09	$49,304.99	$76,578.50	$59,655.22	$32,999.48	$24,880.57
Water	28,128.88	13,173.90	24,862.88	30.042.89	14,241,79	7,415.14
	$122,966.97	$62,478.89	$101,441.38	$89,698.11	$47,241.27	$32,295.71
Total available for depreciation, interest and taxes	$188,449.10	$78,004.79	$76,443.25	$67,639.22	$59,487.04	$56,888.80
These charges:						
Electric	$75,169.67	$41,088.96	$58,383.72	$66,797.34	$47,658.34	$32,340.77
Water	36,423.06	29,832.79	48,341.63	39,838.92	30,341.04	16,686.40
	$111,592.73	$70,921.75	$106,725.35	$106,636.26	$77,999.38	$49,027.17
Net profit or loss	$76,856.37	$7,083.53	$30,282.10 (Loss)	$38,997.04 (Loss)	$18,512.34 (Loss)	$7,861.63

palities, so this job became a tedious one since each City Clerk had his own individual method of bookkeeping and account classification. During the same time the auditors were at work on the books the writer, with his assistants, was gathering all statistical data available and making a study of the physical properties. It was soon discovered that the capital accounts as kept on the city books were not complete. In most instances reserves for replacements and interest and debt service were improperly kept or not kept at all. Therefore, it became necessary to make appraisals to ascertain the reproduction costs of the present properties as well as their present actual values.

The results herein set forth are the true figures for income and expense as taken from the cities' books. Depreciation is calculated according to formulas derived from many years' experience with Florida properties and is based upon the reproduction cost as obtained through this appraisal. The interest upon the investment is computed at 7 per cent upon the present actual value as derived thereby. This is 1 per cent less than the percentage the Florida courts have ruled to be the legal return upon investments of this nature. Taxes are based upon a valuation about 25 per cent lower than the cities' usual valuation ratio to true value and at the cities' millage for the year 1930.

Rates for all services are high

From Table II it is readily seen that one city, "A," is making some money; two cities, "B" and "F," are barely breaking even, and the three other cities are losing money by owning and operating their electric and water utilities. A further investigation was made to ascertain whether or not these cities were obtaining benefits in other ways that would offset these losses. These benefits were low rates for city water pumping, city street lighting and lower rates for general purposes and are analyzed thus:

Water Pumping—The rates these cities charge the water works fund and credit the electric earnings for this purpose are as follows: "A" 2 cents per kilowatt-hour, "B" 4 cents, "C" 1.5 cents and 4 cents, "D" 4 cents, "E" 2½ cents and "F" 4 cents per kilowatt-hour. The writer has personal knowledge of several cities in South Georgia and Florida that buy power for pumping and pay from 1.5 to 1.78 cents per kilowatt-hour, which indicates that the cities that own their own power pay more than those other cities that buy from outside sources. This is further indicated by the fact that regardless of what rate they

Table III—Analysis of Operations in 1930 of City Electric and Water Departments, City of Jacksonville, Fla.

	Electric	Water	Combined Water and Electric
Gross earnings	$2,730,499.26	$442,662.69	$3,173,161.95
Operating expenses	1,002,766.74	226,619.83	1,229,386.57
	$1,727,732.52	$216,042.86	$1,943,775.38
Less depreciation on the valuation set up in annual report	479,044.64	104,106.87	583,151.51
	$1,248,687.88	$111,935.99	$1,360,623.87
Less loss in city taxes, 21.8 mills on $8,000,000	174,400.00	.....	.....
21.8 mills on $3,000,000	.....	65,400.00	239,800.00
	$1,074,287.88	$46,535.99	$1,120,823.87
Less 6 per cent interest on $9,000,000 electric	540,000.00	.....	.....
$3,000,000 water	.....	180,000.00	720,000.00
	$534,287.88	$133,464.01 (Loss)	$400,823.87
Less county* and state taxes 44½ mills on 4,000,000 electric	178,000.00	.....	.....
1,500,000 water	.....	66,750.00	244,750.00
	$356,287.88	$200,214.01 (Loss)	$156,073.87
Less the excess the community of Jacksonville paid above the national average	895,605.44	.....	.....
	$539,317.56 (Loss)	$200,214.01 (Loss)	$739,531.57 (Loss)
Using the Georgia Power Company's average these losses are	$978,547.79 (Loss)	$200,214.01 (Loss)	$1,178,761.80 (Loss)
Using the Alabama Power Company's average these losses are	$1,538,236.13 (Loss)	$200,214.01 (Loss)	$1,738,450.14 (Loss)
The general fund of the city of Jacksonville pays to the electric department:			
For street lighting	$209,659.62	.....	.....
For lighting buildings	17,656.23	.....	.....
For power	27,536.94	.....	.....
	$254,852.79	.....	$254,852.79
For water sewers	.....	$1,500.00	.....
Water, various uses	.....	4,198.14	56,698.14
Fire hydrant rental	.....	51,000.00	.....
		$56,698.14	$311,550.93

*The same people who pay the electric and water bills are practically the same who pay the Duval County taxes and are therefore the losers by the county not getting the benefit of taxes from these utilities.

may charge for this pumping power on their books it remains that this energy cost at their own switchboard must be considered. This cost for these cities is as follows: "A" 1.9 cents, "B" 2.3 cents, "C" 4.0 cents (including line losses to water plant), "D" 3.04 cents, "E" 3.9 cents and "F" 2.7 cents per kilowatt-hour at switchboard.

Street Lighting—These cities charge their general fund for street lighting at the following rates: "A" 4.65 cents, "B" 4.0 cents, "C" 1.5-4 cents, "D" 4 cents, "E" 10 cents and "F" $48 for 225 cp. and $27 for 150 cp. per year, which rates compare fairly with commercial rates where the power company includes renewals, etc., which are in the usual contract.

Average Rates—Under U. S. Senate Resolution No. 83 the Federal Trade Commission was directed to investigate the affairs of electric companies throughout the United States. Judson G. Dickerman, engineer examiner of the Federal Trade Commission, prepared a report, on page 67 of which is given some of the average returns covering the nation at large, including the Georgia Power Company, one of the largest power companies in the South. The 1931 Alabama State Legislature appointed a committee to investigate the Alabama Power Company. This committee, in its report dated June 26, 1931, gives the averages this company receives for these classes of service. These figures are also confirmed by the Alabama Public Service Commission. The following tabulation is a comparison of the average return per kilowatt-hour for each of the six cities studied, with the averages taken from the Dickerman report and the Alabama committee report: These are all 1930 figures:

City	All Classes, Cents	Averages, Residential, Cents	Industrial Power, Cents
National average	2.59	6.07	1.54
Georgia Power Company	1.97	5.77	1.173
Alabama Power Company	1.18	5.05	0.885
"A"	4.43	6.209	4.62
"B"	5.56	*	4.30*
"C"	4.14	6.67*	*
"D"	5.65	9.83	3.39
"E"	5.89	9.54	5.90
"F"	7.87	8.10	4.20
Jacksonville	3.85	*	*

* Only incomplete city records available.

Nearby service would be cheaper

The foregoing tabulations indicate that the consuming public of these six cities is paying from two to three times the national average for all classes combined, from 2½ to 3½ times the national average for industrial power and from 10 per cent to 50 per cent higher than the national average for residential uses.

For illustration, the customers of Florida city "A" paid in during the fiscal year ended in 1930 $94,699.28 more for all classes of service than the same power figured at the national average. These same consumers paid $128,152.83 more than they would figure at the Georgia Power Company's general average and $168,811.76 more than they would figure at the Alabama Power Company's general average. Looking at it from this angle it may be doubtful if the apparent profit of $76,856.37 of Table II is all real profit on the utility operations of this city.

Following these figures through the list of the six cities the tables below give an interesting picture:

Excess Amounts Paid by Florida Municipal Consumers in 1930

City	Over National Average	Over Georgia Power Company Average	Over Alabama Power Company Average
"A"	$94,699.28	$128,152.83	$168,811.76
"B"	61,994.07	73,935.51	91,425.29
"C"	62,947.65	88,126.71	120,209.71
"D"	69,583.20	86,915.20	106,028.40
"E"	45,460.70	54,690.50	64,883.82
"F"	59,746.42	66,762.10	75,701.43
Jacksonville	895,605.44	1,334,835.67	1,894,524.01

Adjusting these differences by deducting the profit or adding the loss in Table II, there is the following result for the true excess paid by Florida consumers of municipal plants for electric service above the averages of other regions:

City	National Average	Georgia Power Company Average	Alabama Power Company Average
"A"	$17,842.91	$51,296.46	$91,955.39
"B"	54,911.03	66,852.47	84,342.25
"C"	93,229.75	118,408.81	150,491.71
"D"	108,580.24	125,912.24	145,025.44
"E"	63,973.04	73,202.84	83,396.16
"F"	51,884.79	58,900.47	67,839.80

Loss amounts to a hidden tax

Are these the prices these communities are paying for the privilege of owning and operating their public utilities? If so and these figures are reduced to the term of mills on the 1930 valuations used by these cities it is evident that these consumers are paying another millage, a hidden millage, that is not shown on their city tax receipts. The size of this tax millage attributable to excess payments for municipal electric service is then for each of these cities:

City	National Average, Mills	Georgia Power Company Average, Mills	Alabama Power Company Average, Mills
"A"	2.2	6.2	11.2
"B"	5.8	6.8	8.7
"C"	10.4	13.2	16.9
"D"	20.8	24.2	27.8
"E"	10.2	11.6	13.2
"F"	12.6	14.3	16.5
Jacksonville	8.82	13.15	18.66

While the city of Jacksonville was not a subject of study among the six, it would be leaving out one of the largest among the municipally owned utilities of Florida not to mention it. The following brief analysis of the operations of the city's electric and water departments is given to complete this story. The figures concerning earnings and operating expense and capital investment are taken from the city auditor's report for the year 1930. The items of depreciation, interest upon the investment, loss in taxes, etc., were calculated in this office from formulas and rates found applicable to Florida properties through years of experience. The figures in Table III are self-explanatory and few words of comment are necessary.

If any further conclusions were necessary they would be summed up in the statement that in so far as definite and permanent tax relief is concerned the results of this study of six typical, medium-sized Florida cities that own and operate their electric and water utilities reveals:

First—That only one showed an apparent profit of any magnitude.

Second—That the cost of energy for street lighting and waterworks pumping is not lower than that paid by other cities buying electric energy from outside sources. Hence no advantage is gained.

Third—That if the difference these cities are paying above the national average or the averages of large power companies operating in adjoining states were converted into mills of taxation it would reveal that these consumers are paying a hidden tax of from 2.2 mills to 18⅔ mills for the privilege of operating their own electric and water utilities.

In the face of these findings one should view with suspicion the idea of municipally owned and operated utilities as a means of reducing the tax burden.

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Match the Psychology of Lighting with Activity of the User

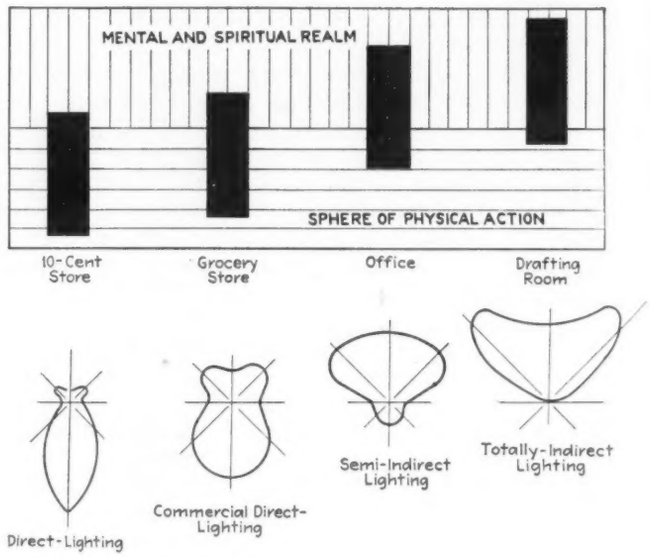
By J. LLOYD KAMM
Illuminating Engineer, Los Angeles, Calif.

ILLUMINATION in some locations is pleasing and comfortable. The same type of installation in another situation would afford but little temperamental gratification, even though it met the economic and intensity requirements. This condition arises from the variation that exists in the psychological attitude of people engaged in different kinds of activities. Not enough has been done to insure illumination effects that will be in harmony with the mental attitude of the persons affected by the lighting system.

Although the study of psychology is extremely broad in its scope, it is only necessary for this discussion to recall that psychologists divide man's conscious activity into three realms, the physical, the mental and the spiritual. In the first the body is an object. In the course of daily routine it is constantly coming in contact with other objects; some it moves, others it eats, drinks, destroys, rebuilds, etc. Every item that could be mentioned in this indefinitely long list implies action. Where an activity of this type is conducted an atmosphere of action should be afforded. We know that the direct rays from the sun provide a pressure, or supply an instinctive desire to move, and in that respect suggests action to us. Consequently, as lighting specialists, we recommend direct lighting for factories, or for streets and tennis courts where people are working or walking about.

While a man's brain is an object, his mind is a subject. The activities on the subjective plane do not imply action. In contrast we desire quiet to prevail where we do our thinking. Illumination for locations where mental and spiritual activities are conducted should therefore be of a quiet type. To meet with this requirement we resort to the use of indirect lighting systems as a means of eliminating the suggestion of action and to create an atmosphere of freedom and relaxation.

Since the activities of our every-day life are not usually conducted on a single plane, it is necessary to provide a combination effect in the lighting to conform with the requirements of each sphere of action. There should be the same relation between the ratio of direct and indirect lighting in the lighting system that there is between the amount of action and thinking or meditation in the activity conducted in the location concerned.



Graphical analysis showing relative thought and action in some commercial fields and recommended form of lighting

A few commercial problems will show how very easy it is to apply this law:

A 10-Cent Store—In this business most purchases are made on the basis of getting an object, rather than choosing it on its merit and value. Therefore, we find that action plays a principal part and thinking is a minor part of this transaction. It is not surprising to find that the most satisfactory illumination systems for stores of this class have a large element of direct lighting embodied in the design.

A Grocery Store—In a grocery store people use much more judgment in the selection of their foods than they usually do in buying a box of tacks at the 10-cent store considered above. This indicates that there should be more attention given to the thinking element than given in the previous example. Also, we should not forget that the average grocery store transaction is more of a getting proposition than it is of a decision affair. Therefore, the lighting should have more of a direct component than it has indirect. To meet this requirement, the application of commercial types of direct lighting equipment is recommended.

An Office—In an office the mental factor predominates over that of action. To meet this situation there should be a larger portion of indirect lighting in the design than there is of the direct. The commercial field has found that the semi-indirect types of lighting equipment afford this form of control and distribution of light.

Drafting and Assembly Rooms—In other locations, such as drafting rooms, lecture rooms and lodge rooms, where the activities are chiefly mental and where but little action is involved, the requirements are for an extremely strong indirect component in the lighting and the corresponding direct factor is of a negligible amount. In some instances, the brightness of the ceiling is sufficient to produce the action effect, while in other locations it is desirable to permit a small amount of light to form a direct component in the distribution afforded by the luminaire. These effects are secured in commercial practice by totally indirect and heavy-density semi-indirect lighting equipment.

The substance of the last few paragraphs has been combined in the accompanying chart. The upper section of the sketch shows the proportions of thought and action found in each activity considered. Immediately below each graph a sketch will be found of the candle-power distribution afforded by the commercial lighting unit that is recommended for that activity. It is noteworthy to compare the similarity that exists between the ratio of the amount of thought and action in the activity with the relation of indirect and direct lighting shown by the respective distribution curves.

Dual characteristic lighting

In choosing the type of lighting it is found that some businesses have a dual characteristic. This makes it impossible to say that a given type of business will require a given type of lighting. An illustration of this point may be had from the restaurants. In the case of the lunch-counter type sales are of a small order, space is usually limited, turnover in sales is rapid. Likewise, the patrons are generally inclined to be in a hurry. The lunch-counter is therefore a place of action and the lighting can be treated much the same as in a grocery store. The other extreme of this business, the restaurant which reflects dignity and refinement, is quite anxious to eliminate the atmosphere of action and produce a condition that is in keeping with the demands of its patrons, namely, one in which the mental component is predominant. This type of business can use semi-indirect lighting to advantage.

In addition to the variations found in different businesses, as described above, there are locations where combination effects are very much in order. An automobile showroom is one of those peculiar problems that a lighting specialist has to treat in this manner. In the first place it is desirable that the showroom be so illuminated that the atmosphere will be an inspiration to the prospective customer, making him feel that the car he is observing would not only be a satisfactory means of conveyance, but would also improve his standing in the community as well. This is a vital point in creating interest and starting a sale. But interest and attention are not sufficient in themselves. The automotive industry is one primarily of action, and so that characteristic should also be prominently expressed by the lighting effect for the showroom. To create additional emphasis on these factors, it is believed that two lighting systems would be most advantageous, the totally indirect system to provide the mental component and a system of small lamp torchères or ornamental lamps to suggest action. This combination could also be combined into a composite fixture in an equally satisfactory manner.

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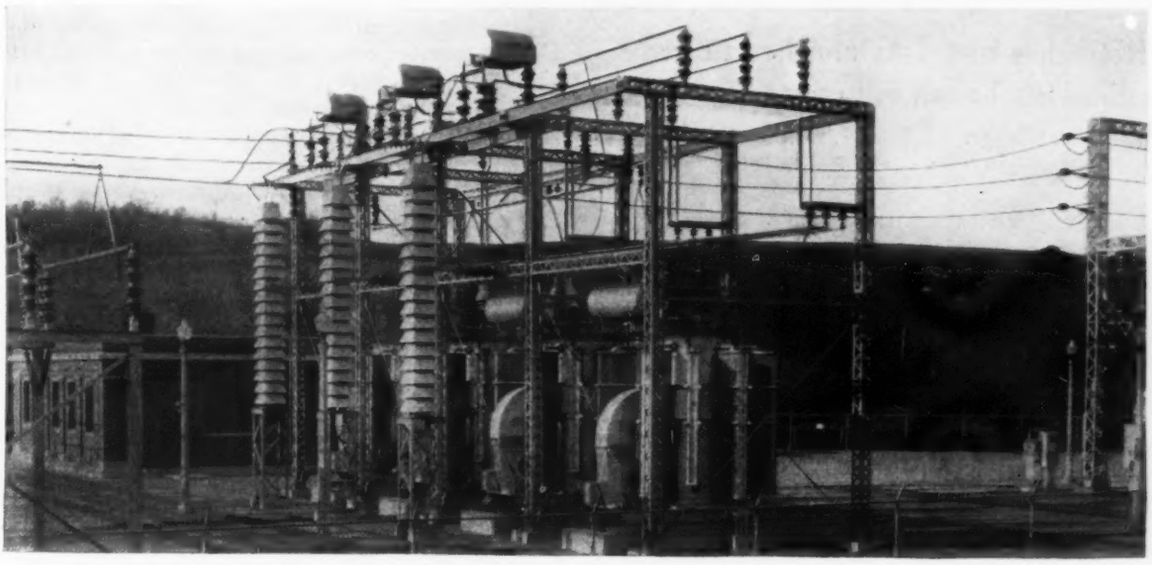
45,000-Kva. Substation Has Supervisory Control

The Ivanhoe substation of the Appalachian Electric Power Company, a subsidiary of the American Gas & Electric Company, which was recently cut in service, serves two important purposes. It is the main switching station for the 88-kv. system in this territory and it provides large amounts of power at 13.2 kv. for heavy load requirements. The transformer bank is rated at 30,000 kva., self-cooled, and at 45,000 kva. with the use of a suplementary forced-air cooling system which is automatically cut into operation through temperature control.

There are three incoming 88-kv. lines and eight outgoing 13.2-kv. circuits. The oil circuit breakers for these lines as well as for the transformer bank are controlled by means of supervisory equipment by the operators at the Byllesby hydro plant, 7 miles away. The various circuits can also be controlled manually at the Ivanhoe switchboard. The use of supervisory control made it possible to establish this combined switching and transformer station at the load center for the district, with the control retained by the hydro operators at Byllesby.



BOOK REVIEWS

Electrical Rules, Regulations, Standards and Specifications

Public Utilities Commission, Hartford, Conn. (Docket 5700) 79 pages, illustrated.

These requirements pertain to (1) system maintenance, service standards of voltage regulation, meter testing, billing, etc., (2) joint overhead line construction, (3) safety rules covering station and line operations.

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Kommutatorkaskaden und Phasenschieber

By Dr.-Ing. Ludwig Dreyfus. Julius Springer, Linkstrasse 23-24, Berlin W9. 209 pages, 115 illustrations. Price, paper, 26 reichsmarks; bound, 27.50 reichsmarks.

The scope of the book is more definitely indicated in the sub-title: The Theory of Cascade Connections of Asynchronous Three-Phase Machines with Three-Phase Commutator Machines for Regulating Power Factor, Speed and Output. This threefold objective practically determines the treatment. Thus the first portion of the book, after necessary introductory chapters, deals with phase advancers; the last part includes methods for keeping the power delivered to another network or to a machine at a fixed magnitude, irrespective of load changes. Under each heading various forms in actual use are taken up individually.

To the industrial or public utility engineer whose work brings problems of controlling the speed or power factor of motors on polyphase circuits this comprehensive analytical treatment should be of considerable interest.

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Direct-Current Machine Design

By A. W. Hirst. Blackie & Son, Ltd., London.

Intended for students who do not care to specialize in the subject. It covers only shunt and compound machines of normal or inclosed ventilated construction.

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Grundsätzliches und Tats chliches zu den Elektrizitätswirtschaften in Europa

By Dr. Joseph Legge. Gebrüder Lensing, Verlagsanstalt, G.m.b.H., Dortmund, Germany. 206 pages, twenty charts, two inserts.

Co-operative electrical operation on a broad international basis, embracing the various countries of continental Europe, is the ultimate goal envisioned by the author. His program is a far-reaching one, not possible of attainment for many years, but one that, when it comes, must rest on further and more detailed studies of just the type presented in this survey.

While fully recognizing the obstacles interposed by traditions, national rivalry and the ever-present specter of possible war, he passes in review the present development of major electrical service on the continent, points out the probable direction of future progress and discusses the economic and engineering possibilities of nation-wide networks, and international transmission or interchange. Aside from the principal thesis, which for its bearing on European industry well deserves consideration by American economists and business leaders, the carefully documented data constitute a valuable work of reference, setting down for the first time, it is believed, a comparative summary that takes in all European countries within a single volume.

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Low Pressure Selling

By James A. Worsham. Midwest Press, Bloomington, Ill. Fourth edition, 233 pages. Price, $2.50.

Every utility man who has any contact with the public is a salesman. Mr. Worsham's "Low Pressure Selling" tells how the most ordinary individual may train himself to sell his company's service and good will successfully. It introduces a new strategy in selling. Mr. Worsham, incidentally, is a sales executive of the Williams Oil-O-Matic Heating Corporation and his organization is said to be one of the few firms in this country showing profits and progress in 1931.

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Relay Handbook and Supplement

N.E.L.A. Relay Subcommittee, National Electric Light Association, New York, N. Y. Publication No. 142. 1,381 pages, illustrated. Price, $6 to non-members (supplement also bound separately, price $3).

Without vitiating the continuing value of the 1926 Relay Handbook, a new editing committee, under H. P. Sleeper, has supplemented the original material with 367 pages of new matter. Descriptive treatment of all new types of relays has been incorporated; the application table and the general index consolidate the references to the new and the previous types of relays. A section on d.c. systems is devoted largely to the relay requirements of the non-attended and automatic stations as well as for industrial systems.

New features, such as the percentage differential schemes and others for loop systems, ground protection and networks, are typical of the advances recorded in the supplement to the section on a.c. system protection. Instrument transformers for relay uses have undergone evolution, which is recorded in another section. An important addition is 100 pages extending the original pages to cover more adequately the matter of three-phase faults and also treat the calculation of single-phase line-to-line faults and ground faults.

On the whole the supplementation brings the relay handbook up to the minute, as far as principles and practices are concerned, without engaging in opinionation as to unproved alternatives in the protective art. Experimental devices and installations are accorded only a probationary recognition.

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Recent N.E.L.A. Committee Report

Performance of Insulating Oils in Circuit Breakers (Electrical Apparatus, No. 169, 60 cents to non-members.)

Four years of tests on thirteen oils in 102 circuit breakers which have and have not operated under load are summarized to determine the feasibility of interchangeability and mixing. A limited agreement on interchangeability and mixing of two oils has been effected. A standard specification is proposed for consideration.

Men of the Industry

H. W. Newell Made Vice-President of Frigidaire Corporation

H. W. Newell, for the past seven years New England manager of the Frigidaire Corporation, with headquarters at Boston, Mass., has been appointed vice-

president of the company with headquarters at Dayton, Ohio. Mr. Newell was born 34 years ago at Bellefontaine, Ohio, and was educated at Dartmouth College, later attending the Amos Tuck School of Business administration and finance. He was sales promotion manager of the Eastern Manufacturing Company for three years. Through an early association in Ohio with the Delco Light Company, a subsidiary of General Motors, he became connected with the Frigidaire organization of New England in 1924. Under his supervision the Frigidaire organization in New England has increased from 24 salesmen to 1,400 dealers and salesmen and in 1931 sales of household units exceeded those of the previous year by 46 per cent.

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Sir Andrew Duncan, the well-known chairman of the Central Electricity Board of Great Britain, has decided to accept the invitation of the Nova Scotian government to preside over the Royal Commission on the coal mining industry of the province. This will be the third time that Sir Andrew has presided over a royal commission in Canada.

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George Gale Gilbert of Mount Vernon, a member of the Illinois Commerce Commission since August, 1929, has been appointed chairman of that body by Governor Louis L. Emmerson. Mr. Gilbert succeeds Charles W. Hadley of Wheaton, who recently resigned to enter the race, on the Republican ticket, for nomination for Attorney-General. Mr. Gilbert for many years served Mount Vernon first as city attorney and later as postmaster, and was a member of the constitutional convention in 1920 and 1922. For ten years he was commissioner of securities under Mr. Emmerson, who then was Secretary of State.

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H. S. Whiton Appointed to New Engineering Position

Herbert S. Whiton has been appointed chief mechanical engineer of the Byllesby Engineering & Management Corporation, the position he has been occupying temporarily since the retirement of H. Boyd Brydon in March, 1930. Mr. Whiton became identified with the Byllesby organization in 1909 when he joined the Minneapolis General Electric Company as superintendent of power. After occupying this position for fourteen years he was named assistant chief mechanical engineer of the Byllesby Engineering & Management Corporation.

Mr. Whiton attended the public schools of Hingham, Mass., and received the degree of bachelor of science in mechanical engineering from Har-

vard University in 1901. He was associated with the Babcock & Wilcox Company from 1901 to 1903, and in 1905 entered the employ of Stone & Webster as chief engineer of the power station of the Ponce Railway & Light Company at Ponce, P. R.

He is a member of the American Society of Mechanical Engineers.

A. W. Lee Vice-President of Louisville Utility

Addison W. Lee, formerly general superintendent of the Louisville Gas & Electric Company, has been appointed vice-president in charge of operation to succeed the late Lewis S. Streng. Mr. Lee will observe his twenty-fifth anniversary with that utility on March 7, 1932. He was graduated in 1906 with a B.S. degree in E.E. from Rose Polytechnic Institute and became associated with the Louisville company in 1907 as construction inspector; in 1914 he was made

head of the inspection and drafting department and later was appointed assistant general superintendent. In 1926 he was made general superintendent.

In addition to being elected vice-president Mr. Lee was also added to the directorate of the Louisville company. Mr. Lee has been very active in aviation circles in Louisville and Kentucky and was chairman of a special committee appointed by former Governor Sampson to draft the present state aviation laws; he is chairman of the Louisville and Jefferson County Air Board, a member of the Board of Trade aviation committee and a licensed pilot.

He is a member of the American Institute of Electrical Engineers, past-president of the Engineers and Architects' Club of Louisville, a director of the Louisville Safety Council and serves on several committees of the National Electric Light Association.

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C. McKew Parr, president of the Parr Electric Company, Inc., is at present in Europe, visiting the various English and continental sales offices of the company. He will return to the United States in the middle of February.

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E. D. Wood, formerly general electric operating engineer of the Louisville Gas & Electric Company, has been appointed general superintendent of the company, to succeed Addison W. Lee, who has assumed new executive duties.

W. C. Mullendore Appointed to New Executive Position

William C. Mullendore, who has been appointed executive vice-president of the Southern California Edison Company, as announced in the January 2 issue of the ELECTRICAL WORLD, became identified with that utility in 1927 as special counsel. He was appointed general attorney for the company in

January, 1929, and was elected vice-president one year later.

A native of Howard, Kan., Mr. Mullendore received his A.B. degree from the University of Michigan in 1914 and the degree of J. D. in 1916 from the same institution. In 1917 Mr. Mullendore was assistant counsel of the United States Food Administration, under Herbert Hoover. After a year as a flying cadet, United States army air service (1918), he again became identified with the food administration as liquidator and counsel during 1919. During 1920 he was a representative of the American Relief Administration in London and Berlin.

Until 1923 Mr. Mullendore was a member of the law firm of Bloss & Mullendore at Winfield, Kan. He established his home in Los Angeles in 1923 and in 1924 became associated with the law firm of Fredericks & Hanna. This association was continued until 1927, when he was engaged as special counsel for the Southern California Edison Company.

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JOHN ANDERSON, assistant to J. G. Barry, vice-president, has been appointed secretary of the sales committee of the General Electric Company to succeed E. G. Waters, who is retiring at his own request on the completion of more than 42 years continuous service, the past 25 being as secretary of the sales committee. In 1910 he entered the General Electric test course at Schenectady, spending a little more than a year in that work both there and at Pittsfield. Subsequent connections followed with the lighting engineering department, lighting commercial department, turbine sales department and the merchant ship equipment department. In February, 1922, he was appointed assistant to E. W. Rice, Jr., then president of the company, and a year later he became assistant to Vice-President J. G. Barry, the position he held at the time of his present promotion.

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B. C. FAIRCHILD has been appointed secretary of the Canadian Electrical Association to succeed H. M. Lyster.

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OBITUARY

A. J. Wurts

Alexander J. Wurts, electrical engineer and a member of the first faculty of the Carnegie Institute of Technology, died at his home in Pittsburgh January 21 in his seventy-first year. For twenty years Mr. Wurts was connected with the Westinghouse Electric & Manufacturing Company as an engineer and worked with the late George Westinghouse in the development of the Nernst lamp. In the course of events Mr. Wurts became acquainted with the late Andrew Carnegie and was elected as the first faculty member of the Carnegie Technical School, now known as the Carnegie Institute of Technology. From 1905 to 1921 he was professor of applied electricity and head of the electrical engineering department. After spending four years as professor of engineering research, he gave up teaching.

Professor Wurts received the John Scott medal from the city of Philadelphia, through the Franklin Institute, for his work with lightning arresters and his discovery of the five non-arcing metals. A native of Carbondale, Pa., he was graduated from Yale with a Ph.D. degree in 1882 and two years later he completed his education at the Stevens Institute of Technology. He was a member of the American Institute of Electrical Engineers.

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SIR HARRY RENWICK, vice-president of the Federation of British Industries, died at Sidmouth, England, January 8, at the age of 72. Sir Harry was one of the best-known figures in the British electrical industry. He devoted many years to electricity development schemes and was the founder and first chairman of the Electricity Supply Publicity Committee. He was chairman of the County of London Electric Supply Company, Ltd., and also presided over subsidiary companies supplying large areas in the south of England. It was under his direction that the first super-power house for London was erected at Barking. It was opened by the King in May, 1925. Sir Harry was created a baronet in 1927.

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JAMES DIXON, some time ago a vice-president of the former Dominion Power & Transmission Company, died at Hamilton, Ont., January 23. He was a member of the original syndicate which acquired the Cataract Power & Street Railway Company in 1900 under the name of the Dominion Power & Transmission Company.

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JOSEPH G. REGAN, in charge of decorative lighting and traffic control sales for the General Electric Company, died in an automobile accident January 1. Born in New York City in 1901, Mr. Regan was graduated from New York University in 1923 with the degree of B.S. in M.E. Following graduation he entered the test course of the General Electric Company at Lynn, Mass. In 1924 he was assigned to engineering and field work on traffic control lighting and three years later he was transferred to the company's general offices in Schenectady, where he devoted his efforts to the sale of traffic lighting and control equipment. In May, 1930, he was also placed in charge of decorative lighting sales. Mr. Regan was an active member of the Institute of Traffic Engineers.

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WILLIAM D. POMEROY, general manager, vice-president and a director of Goulds Pumps, Inc., Seneca Falls, N. Y., died suddenly January 6 after a year's illness. Mr. Pomeroy joined the Goulds Manufacturing Company in 1907. In 1915 he was made general manager and for several years he had occupied that position as well as being elected a vice-president and director of the company. A year ago Mr. Pomeroy was awarded the Melville medal by the American Society of Mechanical Engineers for a paper, which he prepared jointly with Prof. Herman Diederichs of Cornell University, on "The Occurrence and Elimination of Surges or Oscillating Pressures in Discharge Lines from Reciprocating Pumps." Mr. Pomeroy was born in Utica, where he received his early education, graduating in 1895 from Cornell University in electrical engineering. From 1901 to 1907 he was employed with the Bullock Electric Company of Cincinnati, a subsidiary of the Allis-Chalmers Manufacturing Company. Mr. Pomeroy was 57 years of age.

Trade News

Westinghouse Refrigeration Has New Manager

Carl D. Taylor, manager of the refrigeration division of the Westinghouse Electric & Manufacturing Company, Mansfield, Ohio, has announced his resignation from that company, effective January 1. Mr. Taylor has been appointed vice-president and general manager of the Elin Company of Philadelphia.

C. B. Graves, formerly vice-president and general manager of the Standard Home Utilities Company of Chicago, has been appointed as Mr. Taylor's successor. Associated with Mr. Graves will be J. F. O'Donnell, who has been named assistant manager. Mr. O'Donnell has been with the Westinghouse company for several years.

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Announcement has been made of the appointment of J. H. Van Es, formerly of the Edison Lamp Works of the General Electric Company, to the managership of the lighting exhibit of the Electrical Association of Philadelphia.

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Appointment of J. H. Rohrer and H. W. Hendrix as sales engineers has been announced by the Riley Stoker Corporation. Their headquarters will be in Philadelphia.

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Northern Equipment Company, Erie, Pa., announces the appointment of the Hopton Company, Syracuse, N. Y., as representative for Copes feedwater regulators, differential pressure control valves, pump governors, condensate drainage controls and allied equipment.

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M. H. Rhodes, Inc., Hartford, Conn., announces the appointment of A. B. Ayers as sales promotion manager.

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Announcement has been made by the American Foundry Equipment Company, Mishawaka, Ind., manufacturer of the American line of all-electric unit heaters for applications of air heating, of the appointment of G. J. Kalwitz as Chicago district manager with headquarters in the Builders' Building.

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Lukenweld, Inc. (division of the Lukens Steel Company of Coatesville, Pa.), which is engaged in the design and manufacture of parts for machinery and equipment by gas-cutting, press-forming and arc-welding of rolled steel, has appointed two new representatives to handle the sales and service of its products. In the state of Wisconsin the organization is now represented by Welding Engineering Company with headquarters in Milwaukee and in the Buffalo, N. Y., territory (including Erie County, Pa., and New York from the western boundary to Utica) by Marvine Gorham with headquarters in Buffalo.

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Announcement has been made by Lukenweld, Inc., of Coatesville, Pa., of the appointment of Henry H. Peck as manager of sales.

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Electric Supply Company has been appointed representative in Tulsa, Okla., of the Kuhlman Electric Company.

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Devoted to the design, construction, operation, application and maintenance of alternating-current induction motors and their controls, the *Motorizer*, No. 1, Vol. 1, dated December, 1931, made its bow. The new periodical follows in make-up and general policy another monthly distributed by its publisher, the Lincoln Electric Company, Cleveland, Ohio, devoted to electric arc welding. Just as the *Stabilizer* is made up almost entirely of questions and answers covering practical points in the field of arc welding, so will the *Motorizer* perform the same service in the application of induction motors. For the factory electrician occupied with the installation, maintenance and repair of induction motors and their controls, the new publication will undoubtedly be of definitely practical value.

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Rockbestos Products Corporation of New Haven, Conn., has announced the appointment of Merton R. Sumner as manager of the Chicago sales office with headquarters in the Madison Terminal Building.

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Graybar Electric Company has filed a certificate with the Secretary of State at Albany, N. Y., decreasing the authorized stated capitalization from $9,000,000 to $8,000,000.

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Doehler Die Casting Company has purchased from the National Lead Company all equipment, inventories and good will of the Newton Die Casting Corporation of New Haven, Conn. By the purchase of the Newton corporation the National Lead Company becomes a substantial Doehler stockholder. The National Lead Company will be represented on the Doehler board of directors.

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A new eight-page bulletin devoted to splice boxes has been issued by the G & W Electric Specialty Company, Chicago. Because of the increased popularity and possibilities of this type of cable joint, they have completed a new and comprehensive line of splice boxes embodying improvement and new developments, all of which is explained in Bulletin GA.

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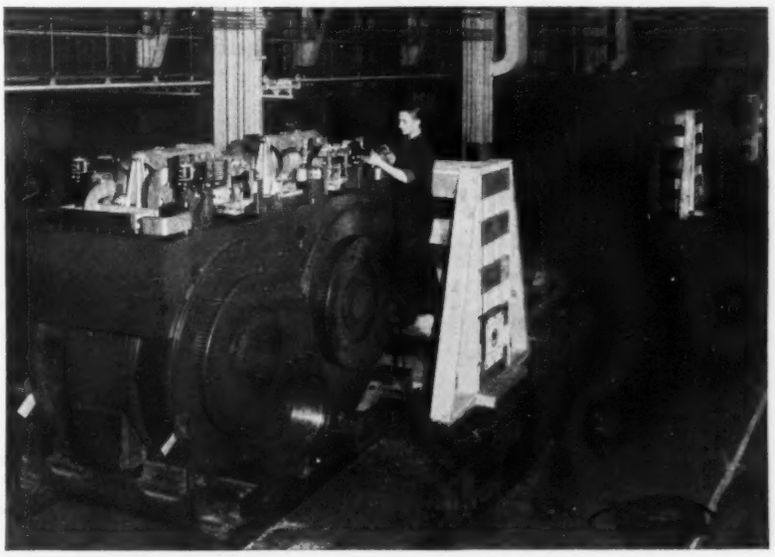
EQUIPMENT FOR ELECTRIFYING PENNSYLVANIA RAILROAD

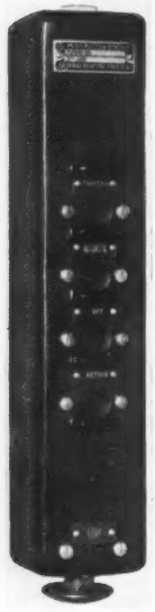


The Westinghouse Electric & Manufacturing Company recently shipped the first consignment of electrical equipment for the Pennsylvania Railroad electrification between New York and Washington. Nine specially developed, alternating-current motors as illustrated, together with controls, made up the shipment.

New Equipment Available

Pendent Type Push-Button Stations

A line of pendent-type, momentary-contact push-button stations, designated type CR-2940, designed primarily for the control of motors driving machine tools such as planers and boring mills, has been announced by the General Electric Company. The stations may be fitted so that they can be carried around readily by the operator of the equipment.



The momentary-contact push-button unit provides both a normally open and a normally closed circuit. The movable contact is a silver-plated disk normally held against the two top contacts by a spring. When the button is depressed this circuit is broken and the circuit across the two bottom contacts is made. The units are mounted on the front of the case by means of screws and are adaptable for mounting on the back of any cover plate or may be built into a machine.

All of the buttons except the "Stop" buttons are protected from accidental operation by means of a guard at the bottom of the button. The "Stop" button is mounted on the bottom of the case and has a mushroom head, which makes the button easily accessible in case of emergency. A nameplate over each button clearly indicates its function. The case is provided with a conduit knockout of ample size at the bottom, and any standard BX fitting together with multi-conductor cable can be used.

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A NEW TYPE OF CENTRIFUGAL OIL PURIFIER for transformer and circuit breaker, in which the oil is centrifugally purified under a high vacuum, has been announced by the Sharples Specialty Company, Philadelphia, Pa., under the name of "Deoxator."

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A NEW LINE OF SERIES-WOUND MOTORS with improved electric governors is now offered by the Bodine Electric Company, Chicago. This new governor has shown itself reliable on such applications as talking motion-picture equipment, electric pyrometer control drives, office appliances, traffic signal control, etc. Although most frequently applied to the series-wound motor, this governor may also be used with the shaded-pole type motors.

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Knock-Out Strip for Reflector Lighting

Wiring duct or conduit for unit assembly or reflector-type illumination equipment which is said to provide a time- and labor-saving method of installation is announced by the Pittsburgh Reflector Company, to be marketed under the name of "Permaflector" knock-out strip. The strip consists of two main parts—the face and the back. The face is provided with suitably shaped knock-outs spaced on 3-in. centers, providing for quick installation of sockets of any desired spacing. The back fits closely over the face, covering three sides of the strip and assuring ample protection to the wiring. "Permaflector" knock-out strip is furnished in standard 10-ft. lengths 1 27-32 in. square. The material is corrosion-proof and finished in silver-colored satin finish.

The square shape of the strip makes it possible to turn corners vertically as well as horizontally, and in bending, drilling or punching a minimum of cutting is required.

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Vacuum Contact Toggle Switch

A new type of switch, featuring sealed-in-vacuum contacts, based on the use of the Burgess vacuum contact actuated by the usual toggle switch movement, has been announced by the Burgess Battery Company, New York. It is flameproof, free from dust and dirt, positive, low-resistance, quick-acting and corrosion-proof.

In the switch the vacuum contact is mounted in a holder held by brackets on the rear face of the switch plate. The throwing of the handle to the closed position serves to actuate the external glass stem of the vacuum contact, either making or breaking the circuit as desired. The vacuum contact is exceptionally sturdy, with a practically unlimited life. It is amply protected by the metal holder. There is no movement of body or leads and no mechanical wear. The vacuum contact switch is rated at 8 amp. intermittently or 6 amp. continuously, 220 volts.

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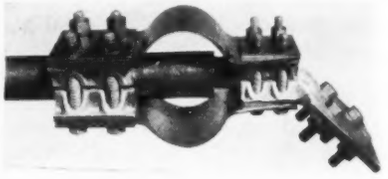
Expansion Joints with Clamp Type Fittings

A line of expansion joints with clamp type fittings has been announced by the Delta-Star Electric Company, Chicago.



Ill. An alignment guide engages the conductor tubing, keeping it in line, but permits of longitudinal motion to compensate for thermal expansion or differences due to settling of station footing.

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New Solid Dielectric for Power Cables

"Okolite" insulation, recently announced by the Okonite Company, is a high-voltage dielectric, specially developed to meet the ever-growing need for a wire and cable insulation, which in addition to possessing the mechanical resiliency and moisture-proof features of a rubber compound is resistant to corona and heat. "Okolite" insulation is adaptable for any insulated wires and cables. In power insulations it is especially suitable for single-conductor, braided cables in places where moisture, heat or corona conditions exist. With it a lead sheath can be avoided, the insulating strength of paper or varnished cambric is obtained and the disadvantages inherent to a rubber insulation are avoided.

"Okolite" is specifically adaptable for generator cables and for other classes of cables in power stations, switching stations and substations. It is especially suitable for submarine cables and is an excellent insulation for underground and aerial power cables. It meets a special need for primary networks where lead-sheathed cables are not desired. An obviously appropriate application of "Okolite" is for high-voltage risers in skyscrapers. "Okolite" insulation adds a great convenience to the electrical industry. It will, it is anticipated, effect many economies if it is used to solve the design and operating problems which present themselves so frequently in power and industrial work.